RAILROAD GAZETTE

FRIDAY, FEB. 28.

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Contributions.

First Cost in Railroad Construction.

TO THE EDITOR OF THE RAILROAD GAZETTE.

Remarkable news comes from England which calls for more than mere passing remark.

Eighteen or twenty years ago the Midland Railway of England commenced a new policy, that of running third class carriages on all trains, and in many other respects, both as to speed and accommodation, the Midland took the lead, which all other companies, unless we except the Great Western, have followed at a respectful distance. Everyone now in England rides third class, except the very few who travel first because they have more money than brains, unless in and about London, where on many lines the old regime still prevails of making the really paying traveler so uncomfortable that he will travel in a higher class of carriage for very misery.

However, London is not England, and the whole of the country benefited by the sagacity of the Midland, which became quite a favorite line. During the first few years, however, while other countries have been striving and raising speeds, the Midland has been very quiet, and even during the period of the race to Scotland of 1888 the Midland was, to use the words of one of the daily papers, "content to look calmly on and carry at the modest speed of 75 miles per hour such passengers as sought its shelter from the headlong rashness of the rival East and West Coast routes."

Now, however, the once-pushing company, in the face of an increased traffic of over $100,000 in one week, has announced the withdrawal of between a third and a quarter of its total express mileage. The trains withdrawn are too numerous to name here, but a few may be selected as examples.

To the north, *i. e.*, to Scotland, out of St. Pancras, London, three fast trains no longer appear on the time table, which means practically giving up the Irish traffic to Belfast to the rival Northwestern. The 9 a. m. to Manchester is stopped. This was one of the fastest trains in the world. Two other equally fast trains, running the 185 miles to Manchester in 4.20 and 4.15 hours respectively, are replaced by a single train. Three fast trains from Leeds to London, one of them doing 196 miles in four and a quarter hours, including stoppages, also disappear from the schedule. Fast trains from Bristol for the west of England are cut out. Dining car expresses disappear, and generally the Midland, with a fine line, the best carriages and splendid locomotives, appears to acknowledge that it has been beaten by its rivals.

How is this? The reason is two-fold. For the last week before Christmas the passenger receipts show a decrease of $22,500, while freight showed $100,000 increase. For the half year freight shows a total increase of $1,095,000, and passengers of $178,000 only. The Midland is well off for business, and is participating in the general boom of business very largely. The line is packed with freight trains, and reports come from all over the country of congested traffic. Freight trains are always being side-tracked to let fast passenger trains go by, and, in fact, the freight traffic cannot get along despite that much of it is run at excessively high speeds by reason of the constant necessity for letting passengers get past. In thus struggling hard for long distance through traffic there has been neglect of short distance and paying short-distance passengers have been vexed and inconvenienced to accommodate fast trains. Of course, a four-track road, as possessed by the Northwestern, would go far to remove the difficulty if a crowded line were the only one to be surmounted.

But there is another cause not so easily wiped away, and which requires physically much more getting over, and that other cause is gradients. It has long been a matter of observation that in its competition for the Scotch traffic the Midland trains make terrific down-grade speeds. Down the Eden Valley, on the borders of Yorkshire, Westmoreland and Cumberland, the pace on the down grade, over high viaducts and round sharp curves, seems really to be the highest compatible with sticking to the track. From Peak Forest to Manchester again, speed is made up at a cost of intense watchfulness for faults in road or vehicle, and generally the Midland routes for fast through traffic are far worse off than the roads of the two rival lines of the east and west coast routes. The geological structure of England accounts for all this. The Pennine range running through the middle of the island from north to south, with numerous cross spurs, is the locus of the Midland, as its name implies, whilst the plains east and west of the backbone form the country over which the trains of the rival lines have to be drawn. It is very clear that on the leveler lines the rate of speed is now near its high water mark, for a few feet more gradient, a worse curvature and a mile or two of distance place the line having such disadvantages out of the range of paying competition and possible punctuality.

It is beginning to be recognized that the want of faith in the powers of the locomotive, which was a controlling cause in constructing the earlier English railroads, has not proved in the long run to have been a bad thing. The Northwestern and the Great Northern lines are both of considerable age, examples of a much earlier system of construction than the Midland. Indeed, the midlands of England were left without a through route between Derby and Carlisle for many years, until, in fact, the powers of the locomotive to surmount heavy grades were recognized. Then the Midland built its northern line, and at exceedingly heavy cost. Mr. Dorsey, in his criticism of the English system of building a road, by combining directness with the greatest possible ease of gradient, entirely overlooked these facts. To-day it is a matter of thankfulness to two lines that their constructors laid out many hundred thousand dollars for the sake of directness and level. George Stephenson, who, if he did not invent the locomotive, believed in its future, was a shrewd man, and despite his faith in the future of the locomotive would have no dealings with lines on the "undulating system" as the surface roads were then described. He saw plainly that locomotives were good to haul with, but bad as cranes, and all his lines were as level as they could be reasonably well made. Much money was laid out in this—wasted, some say—but time has shown a leading company practically confessing that it cannot compete with rivals who possess easier grades and virtually relinquishing to them its through express traffic.

Excepting in the fen country, grade crossings in Britain are exceedingly rare and almost unknown unless on by-roads, and some that did once exist have been removed and sunk or carried over the rails.

It may be long before the sharpness of competition on American railroads between large centres becomes so keen as it has been in England. American conditions, too, prevent the attainment of English speeds. An American long journey implies a sleeper and a buffet car. In England the traveler may go from London to Aberdeen, 552 miles, between ten o'clock in the morning and 11:20 the same night by one route. By another he could rise from breakfast at Brighton, on the South Coast, as late as 8:40, and dine in Aberdeen the same night at 11:30, a distance of 590 miles with a two-mile cab drive across London, or he could leave Inverness at 6 in the morning and be in London before midnight, 594 miles.

Such a journey of 600 miles is an excessive one in England, and sleepers are uncommon, for they are hardly required, as they are here; and it is worth noting that of two trains between Leeds and London leaving Leeds at 4:25 and 5:25, the latter, which runs a dining car, requires 15 minutes longer than the former in a journey of 4¼ hours, taking 4½ hours to do 196 miles. This extra 15 minutes appears to be the dining-car traction, and in any train a difference of 15 minutes is enough to repel or attract passengers.

Now, while not disputing that the construction of a railroad may be much cheapened by neglecting to secure favorable grades, there certainly appears good reason to suppose that cheapness of original construction may stand in the way of ultimate success, as is proved by English experience; and it may well enter into the calculation of American railroad men whether, in the more settled and thickly populated parts of the country, a nearer approach should not be made toward that solidity of permanent works which characterizes the roads of older countries.

It is not likely that American railroad speeds will continue to be as moderate as they still are. America's enormous territory calls for intercommunication at rapid rates more than the limited area of Great Britain, and yet we see in Great Britain a striving after quick traveling, which should rather characterize a country of long distances than an island, or collection of islands, no part of which of any business importance is more than 600 miles from any other part, and in which one can nowhere get more than 70 miles from salt water. If quick traveling is of such importance to the English, it must surely be of equal importance to Americans, who are, perforce, compelled to spend very much more time in journeying between centres of business, the like to which are separated only by four or five hours in England.

The importance of an easy, level road is clearly very marked as a factor at top speeds in securing the lion's share in through traffic, and that line which can run mile by mile between such moderate speeds as 40 and 50 miles per hour, must have an immense advantage over a rival which has to make up at 75 miles velocity the time lost in climbing hills at 30 miles or less. Of course, through some parts of the country no easy line could be constructed; but given two routes through any one district, that which was constructed at heaviest expense of standing works—to use an English term—is best placed for securing the fast traffic and building up a permanent business. It is largely because of the easy grades which prevail through the bulk of the Northwestern line that the company's stock stands at its present level premium of over 80 per cent.

BRITON.

Shall Distant Signals be Compensated?

TO THE EDITOR OF THE RAILROAD GAZETTE:

I note in the paper read before the New England Railroad Club on the subject of "Railroad signals and signalling" by Mr. R. H. Soule, he says, after he mentions the subject of the introduction of two wires for operating signals, "This was followed by efforts to introduce automatic compensators into the two-wire system of connections. In general these were expensive, and sometimes dangerous, as when a certain one of the two wires broke, in which case the signal might be left in the clear position. It subsequently developed that with two-wire connections it was entirely practical to omit all automatic compensating devices, and such is now the very general practice. Both wires are fitted with adjusting screws which need to be used only between extremes of temperature. Ordinary slight variations of temperature result in no movement of the signal blade, as both wires are affected equally. Neither are the wires thus subjected to undue strain; in their natural condition they are full of kinks, which give and take enough to more than accommodate the alteration of length due to changes of temperature such as occur in practice."

This question of compensators for distant signal connections is one which railroad officials and signal engineers differ upon more than on any other one point in the whole art of signaling, and I cannot make myself believe that railroad companies have discarded the use of compensators.

The question of using or omitting compensators is a serious one, which should be determined by actual test, covering a long period of time (so as to get a great range of temperature). The test should include automatic two-wire compensators, together with the method recommended by the Union Switch & Signal Co. of depending for this compensation on the kinks in the lines of wires for general uniform temperature, and the adjusting screws placed in the lines of wires for sudden changes of temperature.

Thus far I have little faith in this modern kink method of wire compensation, and have begun to think it is a business kink. I presume there might be something in it, were the signal companies in control of the weather bureau and could they give us a nearly uniform temperature, sending out special notices in advance of any sudden change which might expand or contract the line of wires to any great extent, so that men could be stationed at each signal to make the necessary turns to the adjusting screws at the proper hour; but inasmuch as the signal companies are not thus empowered, and inasmuch as we often have from 40 to 60 degrees change of temperature within 24 hours, let us analyze this kink method and see if the results obtained from our analysis do not correspond with what we find in practice.

The wire usually used in signal work is what is known commercially as No. 9 special galvanized steel signal wire, and has a diameter of only 0.114 in. It is shipped in bundles about four feet in diameter, and has no kinks whatever which can be observed. This wire has more or less "stretch," which must be taken up by means of the adjusting screws for the first few days after the signals are placed in service, unless it is previously stretched by means of a pulley block, or force of men, pulling on one end of the wire while the other is securely tied to the track. This method of taking out the stretch is very common among signal men. Now—

First.—Supposing, that after this stretch was taken out and the signal adjusted to work perfectly with a uniform temperature, a fall of temperature of 10 or 15 degrees takes place, which is an average change. The wires thereby become taut, having contracted enough to take up all the slack and kinks. What would be the result if the temperature should fall 30 or 40 degrees more? Simply, the line of wire must either stretch or break. If it stretches, the wires for the next day's work, after the temperature has risen with the morning sun, will be very slack, the signal blade will not go down to its safety position when the lever is thrown, but remain at a "half-cocked" position, which may mean either danger or safety. If the wire breaks, of course the signal blade goes to danger, if properly connected up, but in either case a man must be sent to adjust or repair the connection.

Second.—Supposing the temperature rises suddenly many degrees after the wires have been adjusted properly for average cold weather, what is the result?

The kinks, if there are any, may take up a small amount of the slack, but the balance remains in the line, and when the lever is thrown to safety the signal responds only to a mid position and may mean safety or danger.

Third.—Again, supposing that after the signal contractor has completed the erection of a plant, and has adjusted his kinked wires to an equal tension, warm weather comes, the wires expand, and this expansion is taken up by the adjusting screws through the efforts of an ignorant signal repairer, who, unintentionally, perhaps, leaves the "pull to safety" wire shorter than the "pull to danger," which is practically cutting out the "pull to danger" wire and depending upon gravity to return the signal blade to danger, what is the result. The first fall of temperature of any magnitude will contract both wires equally; the shorter, or "pull to safety," wire will, however, pull the signal blade to the "half cocked" position, and a safety signal be taken by an approaching train when "danger" was intended.

Fourth.—Again it is a well-recognized fact with signalmen that constant pulling on a line of wire of any length stretches it, either by elongating it permanently, or by straightening out its kinks, hence the "pull to safety" wire, eventually, through constant use, becomes longer than the "pull to danger" wire, which, during the warm season, has no work to do. This elongation being taken up from time to time by the adjusting screws, what will be the result when a sudden fall of temperature occurs? The "pull to danger" wire having had no stretch taken out of it still has the kinks, if such there are, and is capable of elongating enough by this very action of taking out the kinks, to permit the "pull to safety" wire to contract sufficiently to pull the signal blade to the "half cocked" position, and a safety signal may be given when danger was intended.

Fifth—Again, if all the signals in an extensive signal system were connected up without compensators, a sudden change of temperature of any magnitude will throw a great many signals out of adjustment, which would require many men to adjust, and some of these men may have very poor judgment regarding the proper tension to give the wires, may simply adjust the "pull to safety" wire so that the signal blade will work properly, but leave the "pull to danger" wire out of adjustment, which surely will give a false reading of the signal at the next sudden change of temperature unless attended to in the meantime.

Now, does this correspond with practice? Do we see all the conditions mentioned above occur in everyday work? All the above conditions have occurred under my personal observation. Signals have been erected under this modern "kink" method, have been carefully watched, daily reports made of all signal failures, and it was found that when the signals were adjusted to work perfectly during the night, they have failed to work during the heat of the day without further adjustment during some portions of the year. Wires have been repaired, broken by a sudden fall of temperature. False readings have been taken by approaching trains of the signal blades standing in the "half cocked" position, and signals have been thrown out of service from their unreliability, and I do not believe it is possible with the general class of signal repairers to get anything like accurate work with our signals unless they are compensated.

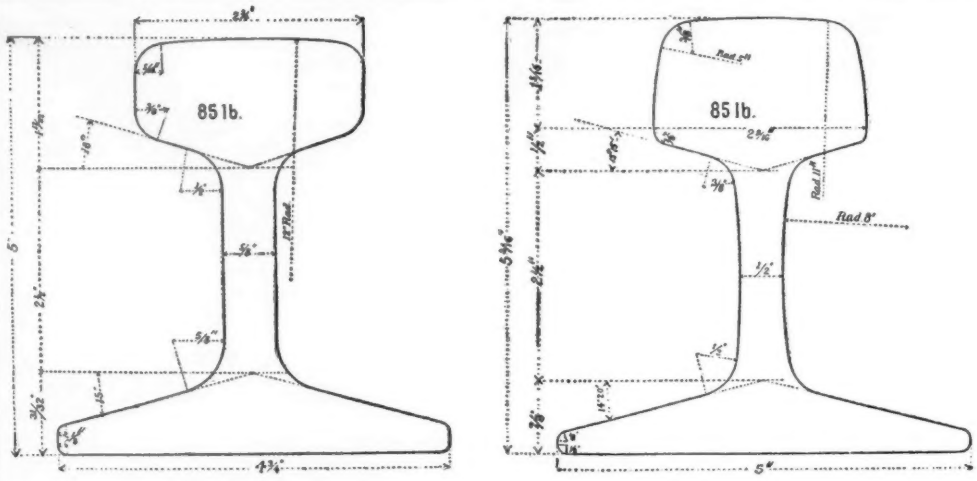
I have also carefully observed signals connected up with wires properly compensated and no adjusting screws whatever in the line to be meddled with, and have seen excellent results obtained from their use. Many of the lines of wire were not adjusted from the day they were placed in service to the present time. I have obtained excellent and satisfactory results from both the Mitchell & Stevens' two-wire mechanical compensator and the improved Johnson liquid compensator, and I understand that no failures have occurred on the Erie with the former compensator since its first introduction in the latter part of 1888, by Mr. Mitchell, one of the inventors, and the signal engineer of that system at the time.

I do not want it understood that I advocate the application of compensators on lines of signal connections less than 500 or 600 ft. in length, as in this distance a long stroke, and possibly the above-mentioned kinks, will give but a very slight variation in the stroke of the signal blade; but for all lines over 500 or 600 ft. in length compensators should be introduced. Usually from two to four distant signals are erected at interlocking points, and the extra cost will, therefore, vary from $70 to $140 per plant; but we gain thereby extra safety in the positive throw of our signal blades.

There is no doubt that compensators, if properly built, carefully erected and occasionally inspected, can be depended upon, and a large saving made in cost of maintenance, to say nothing about the increased safety of trains. The compensator to be adopted by each railroad system must be decided by a test, but from what I have seen of the Mitchell & Stevens' two-wire mechanical compensator, I much prefer it for the following reasons: 1st. It being entirely mechanical in its action. 2d. It maintaining a constant or uniform tension of both wires at all times and through all changes of temperature, said tension being only sufficient to keep the wires taut. 3d. The ease with which signals can be operated at any distance, as no counterweight whatever is raised, except the usual spectacle casting. 4th. The infallibility with which either wire will become disconnected when the other wire breaks, thus causing the signal to go immediately to danger. 5th. The adaptability of this compensator to any length of connection, without any change whatever, thus doing away with the necessity of keeping a stock of compensators on hand to cover all distances.

The question of whether it is right to omit compensators on long distance signals operated by wires, when it is a well recognized fact that signals without compensators often give false readings, and need to be frequently adjusted, may some day be answered in a court of justice after an accident has occurred, causing loss of life, from the wrong reading of a signal standing in a false position. This question is a moral as well as a financial one. If after a long test of modern automatic compensators they are found unreliable, then is the time to throw them away, but surely not without an exhaustive trial.

SIGNAL ENGINEER.



Delano Section. McClure Section.

EXPERIMENTAL RAIL SECTIONS—CHICAGO, BURLINGTON & QUINCY RAILROAD.

Tests of Stiffness of Rails.

An advance sheet has been issued of a "postscript" to the paper of Mr. P. H. Dudley, on "The Wear of Rails as Related to their Section," read at the Ottawa meeting of the American Institute of Mining Engineers. That paper was published in our issue of Nov. 29, 1889. The Delano and McClure sections, tests of which are given in the paper now published, were shown in our issue of April 13, 1889, together with three other recent sections much like Delano's. Those two sections are here reproduced. The distribution of metal in the sections is as follows in percentages:

	Head.	Web.	Flange.
Delano	41.00	21.46	37.54
McClure	47.51	18.95	33.54

Mr. Dudley's "postscript" follows:

Soon after the distribution of the preliminary pamphlet edition of the above paper, I received the appended letter and tables from Mr. Fred. A. Delano, Engineer of the Bureau of Rail and Rail-Joint Inspection, Tests and Records of the Chicago, Burlington & Quincy Railroad Co. The tables furnish such important data concerning the stiffness of rails, as modified by the quality of the metal, that I have obtained Mr. Delano's permission to publish them in connection with my paper.

It is proper to say here that my statement with regard to the stiffness of the New York Central 80-lb. rail was made at the New York meeting of the Institute in February, 1889, prior to the rolling of the Chicago, Burlington & Quincy experimental sections. The tests of those sections, as given in Tables I. and II., indicate an excellent quality of metal, having a high elastic limit, probably exceeding 65,000 lbs. per sq. in., for the metal in the base of the rails. Comparing these tests with the single one of the low-carbon 80-lb. rail of the New York Central, it will be seen that the metal in the latter takes a permanent set at a much lower strain. Tests of the same grade of metal in rails nearly as heavy indicate that the elastic limit of the metal in the base of the rail will not exceed 40,000 lbs. per sq. in.

The average of the results of the Delano section shows greater stiffness than the single test of the New York Central, except at 10,000 lbs. The "moment of inertia" of the latter is 26.96.

At 20,000 lbs.	the Delano section is nearly	1	per cent.	stiffer.
" 30,000	"	"	"	4	"	"
" 40,000	"	"	"	6	"	"
" 50,000	"	"	"	6	"	"
" 60,000	"	"	"	6.6	"	"
" 70,000	"	"	"	10	"	"
" 80,000	"	"	"	14	"	"
" 90,000	"	"	"	55	"	"

The elastic limit of the steel was passed between loads of 60,000 and 70,000 lbs.

The 80-lb. section, the tests of which were reported in my paper, was a piece from the first 1,000 tons rolled. The percentage of carbon specified was from 0.45 to 0.50. Why the makers allowed it to go below, I have never understood. The carbon has since been specified as 0.60 to 0.65, the stiffness and hardness of the rails being increased accordingly.

Under the present heavy wheel-tonnage, rails are wearing more rapidly than formerly; the subject is being studied more carefully, and, as a consequence, rails of better physical properties are demanded. One railroad company, making tests of rails of its standard section as rolled by three different mills, was surprised to find a variation of over 20 per cent. in stiffness among the rails of the different makers. In hardness, the variation was even greater.

It was clear, in this case, that the difference in physical properties could not be ascribed to differences in section, but was due to differences in quality of metal. This has since been verified by comparisons of the wear of the rails in the track under practically the same tonnage.

The following are the letter and tables received from Mr. Delano:

I have read with a good deal of interest the paper on rails which you read at the Ottawa meeting of the American Institute of Mining Engineers, and in view of the fact that your paper is having pretty wide circulation in the railroad journals, I venture to correct a statement which you make in regard to the stiffness of your New York Central 80-lb. rail. Last March the Chicago, Burlington & Quincy had 1,000 tons of each of two different sections of 85-lb. rail rolled at South Chicago for experiment; and, after the order was completed, four samples, 4 ft. long, were cut at random from rails on which the heat number was plainly stamped (*i. e.*, four of each section), and sent to the Watertown Arsenal for test. A partial report of the test, made in September, has been received, and I have tabulated it (see Table I.). This and the accompanying smaller sheet (Table II.) will, I think, satisfy you that each of these 85-lb. rails is stiffer than the New York Central 80-lb. section, although you will note, from the actual weights of the samples tested, that the average weight of each of the groups is appreciably less than 85 lbs. per yard. The vertical moments of inertia for these two sections are respectively 28.61 for the McClure and 27.34 for the Delano section. How do these compare with your New York 80-lb. section?

I think you will be interested in seeing that the McClure section, although having a higher moment of inertia, does not, from the Watertown tests, prove to be an appreciably stiffer rail. This is what I worked for and what I expected. In regard to the chemical analysis given, I warn you not to build too much upon it, as it is simply the determination of the rolling-mill from the test-piece of the same heat number as the rails tested. The Watertown people have promised to make analyses from the actual samples, and these should be of value.

[We have condensed the tables. Mr. Delano's Table I gives deflection and set for four different tests of each section for loads varying by 2,000 lbs. up to 140,000 lbs. We give only the averages for each 10,000 lbs. We have added also the New York Central tests from Mr. Dudley's earlier paper. Mr. Delano's Table II gives the determinations for four specimens of each section. We reproduce only the averages.—EDITOR.]

TABLE I.

Transverse Tests of 85-lb. rails for the C., B. & Q. R. R. made with the United States testing machine, at the Watertown Arsenal, Mass., Septemper 20, 1889, supports 30 inches apart; to which are added tests of the 80-lb. New York Central rail made on the same machine June 21 and 22, 1888.

	Deflection. Ins.			Set. Inches.		
Load in lbs.	McClure.	Delano.	New York Central.	McClure.	Delano.	New York Central.
10,000	.0091½	.0095	.0091	.0003	.0005½	.0019
20,000	.0189¾	.0195	.0196	.....	.....	.....
30,000	.0283	.0289½	.0300	.....	.....	.....
40,090	.0372	.0379¾	.0400	.0006½	.0009⅛	.0036
50,000	.0462½	.0469¾	.0498	.....	.....	.0048
60,000	.0551½	.0560¾	.0597	.....	.....	.0063
70,000	.0645½	.0652¼	.0722	.....	.....	.0085
80,000	.0741¼	.0748⅛	.0855	.0025¾	.0020¼	.0116
90,000	.0847	.0855¼	.1326	.0046½	.0038¾	.0447
100,000	.0962¼	.0975¼	.2488	.0072	.0065¾	.1477
110,000	.1112¾	.1117⅛	.4125	.0129¼	.0116¼	.....
120,000	.1399¾	.1350⅛	.6440	.0319¾	.0250¼	.5143

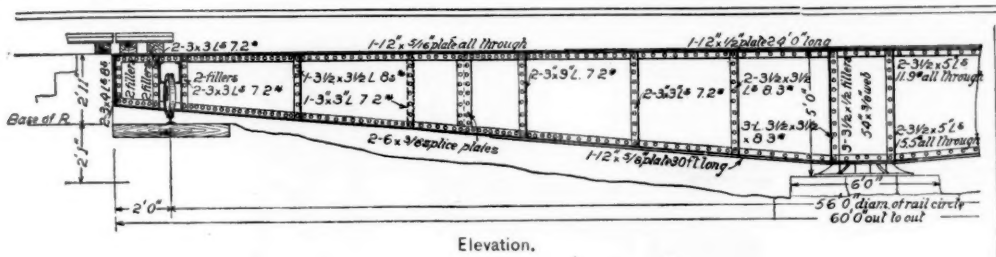
TABLE II.

	McClure.	Delano.
Deflection at 100,000 lbs	0.0962	0.0975
Set at 100,000 lbs	0.0072	0.00675
Approximate elastic limit	111,000	111,000
Hardness, by pyramidal cutter	22.915	24.935
Height, inches	5.18	5.01
Weight, per yard	83.73	83.49
Carbon	0.4225	0.4875
Phosphorus	0.0955	0.1023

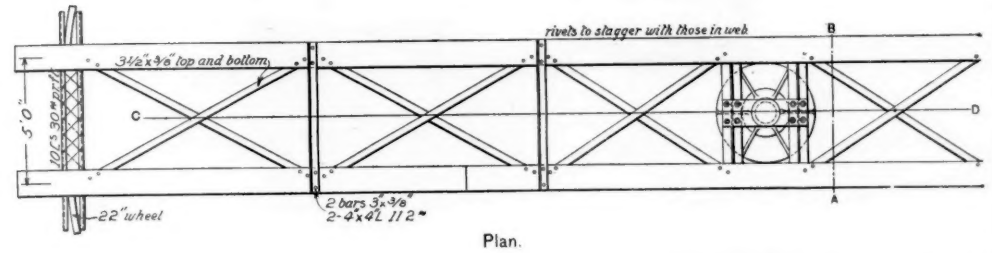
NOTE.—The Delano has greater deflection and less set at 100,000 lbs. than the McClure.

Locomotive Turn-Table.

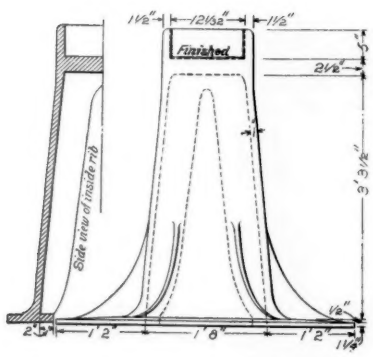
The iron turn table which is illustrated herewith is a form that has been built for two or three years by the Chicago Forge & Bolt Co., and the design is the outcome of many years' experience in this line of work. The

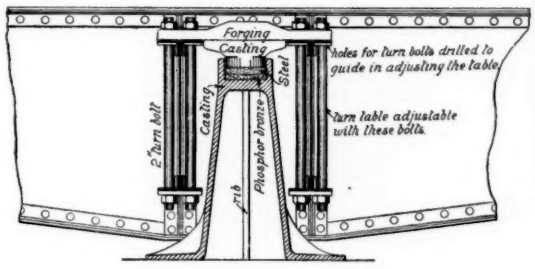


Elevation.

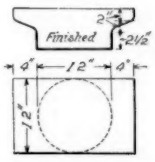


Plan.

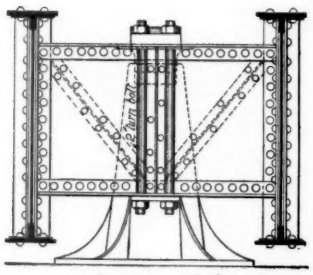




Section on C D.



Top Centre Step.



Section on A B.

60-FOOT TURN-TABLE FOR 100-TON LOCOMOTIVE.

BY THE CHICAGO FORGE & BOLT CO.

points of especial merit which are claimed for it may be summed up as follows: The centre bearing being higher than the centre of gravity, the structure balances easily. The strain on all cast iron parts are in direct comparison. The top centre piece, usually made of cast iron, is forged wrought iron. The lower bearing is made concave, of phosphorus bronze, and the upper bearing is of steel, convex in form. The faces of the bearings are ground together, insuring equal distribution of load, even when the turn-table is not perfectly horizontal.

The centre bearing is 12 in. in diameter, covering an area about four times as great as is ordinarily used for iron turn-tables; the load per square inch on the surfaces in contact is therefore not sufficient to force out the oil. The centre casting is very heavy and strong, and weighs about 1,800 lbs. The adjustment is accomplished by means of nuts in the suspension bolts, shown in the sections. Jam nuts are used on these bolts, but are not shown in the drawing. If it is necessary to take out the centre bearings, this may be done without jacking up the table —simply by blocking under the centre and removing the nuts of the suspension bolts. These turn-tables are riveted up complete at the works, ready to be put in position.

Failure of the Walnut Grove Dam.

The dam of the Walnut Grove Water Storage Co., near Prescott, Ariz., gave way Feb. 22, and the latest dispatches indicate that it is almost completely swept away, and that many lives and much property have been lost. The accounts, however, are so conflicting and so meager that it is impossible to say what the probable loss of life is or what was the cause of the failure of the dam. Thirty-four persons are now known to have been drowned. There had been heavy rains for several days, and the press dispatches state that the breach was caused by the water rising above the top of the dam at its middle. We reprint below an account of this dam, which was published in the *Railroad Gazette* of Nov. 9, 1888, and which is an extract from a paper read by Mr. Luther Wagner before the Technical Association of the Pacific Coast. The dam was 400 ft. long on top and 110 ft. high at the middle. It was 140 ft. wide at the bottom and 15 at the top.

This dam is on Hassayampa Creek, about 35 miles south of Prescott, Ariz. The drainage area above the dam is 390 square miles; annual rainfall not known, but supposed to average 16 in. The dam was built to store water. Some pine timber growing at an elevation of 6,000 to 8,000 ft. on the Bradshaw Mountains is the only available source of lumber supply, but the quality is very poor, knotty and unsound, and very brittle. The country rock at the dam site is a coarse-grained granite, easily quarried. The high price of good lumber, cement and supplies determined the choice of methods of construction.

Work was commenced on the dam by Prof. W. P. Blake, who carried a wall across the cañon to bedrock through about 20 ft. of sand and gravel. What his intentions were to do next is not known, as no records were made or kept by the company's officers at the dam. He was succeeded by Col. E. N. Robinson as chief engineer, and the work was contracted for by Nagle & Leonard, of San Francisco. Under Colonel Robinson the dam was commenced in the rear of the Blake wall, and was described in the specifications as being composed of front and back walls 14 ft. at the base and 4 ft. at the top, with loose rock filling between. The dam to be made water tight by a wooden skin or sheathing.

Quarries were opened by the contractors upon both banks of the stream above the top of dam. The stone was loaded upon cars, having the bed inclined at about 15 deg., and were lowered on the dam by a bull-wheel and brake, a three-rail railroad being laid on trestle across the dam, height from 10 to 15 ft. On the slope midway was a turnout so as to allow the loaded car to pass the empty car. The loaded car was unhooked on the level and run out and dumped and returned above by the next loaded car. The legs of the trestle were left in the wall; only the caps and stringers were raised. During the first stages of construction derricks were used to distribute the larger stones; later the centre was kept high and the stones for the wall were moved by bars. The effect of this upon the stability of the dam is bad, because it tends to form curved beds whose slope makes an acute angle with the direction of the resultant pressure.

Cedar logs 8 to 10 in. in diameter, by 6 ft. long, were built into the wall on the upper face, and projected out 1 ft. Vertical stringers 6 in. × 10 in., of native pine, were bolted to the logs; the stringers were about 4 ft. apart; at the joints of the 6 × 10 stringers a cedar log was built in the wall about 2 in. above the top of the stringers, and two 4 × 10 splice pieces bolted through the log and spiked to the 6 × 10 pieces with galvanic boat spikes, completed the joint. Upon the main wall of the dam a double planking of 3-in. boards was laid, having a tarred paper put on with tacks between the planks. The outer row of planks was calked with oakum, and painted with a heavy coat of paraffine paint (refined asphaltum dissolved in carbon bisulphide). The junction of the plank skin and the bed rock was secured by Portland cement.

Through the dam is a culvert 3 × 4 ft. inside, about the level of the old creek channel. This is boarded with 3-in. plank inside, and has a gate to draw off the water and waste it.

With 70 ft. of water above bed rock the dam leaked 141 in. (1.6 cu. ft. = 1 in.). Various theories were advanced for the cause of the leak: one was, that settlement of the dam had forced an opening of the junction of the inclined and horizontal skins; and another was that it leaked over the whole surface. The extreme right hand skin, below the bed of the stream, is made of but one plank. The machinery for draining the water was inadequate, and the men who did the cementing to bed rock assured me that they worked in 4 ft. of water, and that they did not go to bed rock, while per contra, the sub-contractor—"Whoop 'em up, Jack!"—for the work assured me that it was well done. The probable cause of leakage, I believe, is all three of the reasons named.

The contract for the dam proper was for 46,000 cu. yds., lumped at $2.40 per cubic yard. The skin and cementing was extra. Lumber cost about $15 at the dam; $2,000 freight was paid on $1,000 worth of cement purchased in San Francisco.

Labor was quite unreliable, perhaps owing to the presence of saloons and gambling shops, and the totally inadequate provision made for the comfort of the men by either the company or the contractor. This, coupled with the intense heat, poor water and food, did not offer sufficient inducements to attract a sober and reliable class of workmen, a point too often overlooked in the construction of a large work.

The Works of E. P. Allis & Co.

These well known manufacturers of stationary engines and pumping and general machinery, are driven with work. The rapid growth of the output continually demands improvements and extension, and the company will soon erect a new machine shop covering all space available in the grounds. The new mill shop is 228 ft. × 72 ft., has two floors, and is covered with corrugated iron. A Baldwin 14 in. × 24 in. locomotive is used to carry work to switch cars about the yards.

Among the novelties of these works is a pit lathe for turning grooved pulleys for rope transmission. This pit will take a wheel 40 ft. in diameter and 11 ft. 4 in. face. Overhead is placed a 20 ton crane. In the present arrangement eight tools can be run upon one wheel.

In progress of construction is a mine pump for the Chapin mine. The size of this pump can be appreciated from the dimensions of the fly-wheel, which is 40 ft. in diameter and weighs 150 tons.

One of the most interesting tools in this shop is the new electric crane built under the Shaw patents, which is considered by this company to be the finest crane in the market. In the new shops several of them will be placed. These cranes carry electric lights which are lighted by the currents which drive the machinery. Turret lathes are here used to great advantage.

Among the interesting machines manufactured here are numbers of band saws for heavy work. In four years 125 of these machines have been built. The saw plates are 10 inches wide, and the wheels which carry the saws are nine feet in diameter. A recent improvement in this machine is the use of a heavy balance wheel for the lower wheel instead of the light ones ordinarily used. This makes the saw run steadier and gives it a greater capacity. The construction of these balance wheels is most ingenious. The spokes are interlaced when cast, and are made in such a way that nearly, if not all of the internal strains of the wheel are removed.

Here are being constructed 17 blowing engines of enormous size, having 84-inch cylinders. They are of special design, and have been giving such good results that a large business is anticipated. One of the new pumping engines is to have a capacity of 18,000,000 gallons against 310 ft. head. The cylinders are triple expansion, the low pressure being 104 inches in diameter.

Among the improvements by Mr. Reynolds recently is a feed-water purifier located within the boiler. It consists of a vertical drum, arranged to collect all sediment and scale-producing impurities as soon as the water is heated.

The electric companies are looking with favor upon large engines for driving dynamos, and this company finds an increased business in such work. Six 1,000 horse-power engines are now building, and one 500 horse-power for the West End Railroad Co., to drive the electric cars. These engines are triple expansion, and have 30-ft. balance wheels.

An extended use is made of steel castings for all sorts of clutches and hubs which must be strong and reliable. The castings which this company use are purchased in Alliance at a price of about 10 cents per pound, only the best castings being used.

The output of Reynolds' stationary engine is about one per day. Some of these engines, which are of the Corliss type, have an 18 42 in. cylinder, and are run at 120 revolutions. Two thirds of the horse power of all the engines built at this works is for electric work. At the present time, seven engines of 1,000 H. P. each are being constructed for such uses.

A curiosity in engine use is shown at this shop in the

shape of a 16 × 42 in. stationary engine running at 75 revolutions for nearly 24 hours each working day for the past four years. It has not been repaired or had anything done to it except packing stuffing boxes and oiling. No leak is observed in the packing ring, which is one single ring, or in the valves. In another case one engine, a 12 × 36, ran seven years, averaging 19 hours per day and 80 revolutions without requiring new packing.

The drawing room is one of the best fitted in the United States. The drawing tables are made of special design of several sizes, and in a manner to be accessible from all sides, special attention being paid to the easy production of drawings of large sizes.

Indicating Locomotives.

BY F. W. DEAN.

In the *Railroad Gazette* of Sept. 20, 1889, I described a pantagraph indicator gear for locomotives, as applied by the Strong Locomotive Co. Since then I have had occasion to use a similar arrngement on the Old Colony, of which the following is a description: The indicator was placed above the steam chest, and in order to reduce the height of the stand which supports the indicator gear, the pantagraph was, in a sense, turned inside out from the arrangement used on the Strong engine. The height of the stand was thereby reduced some 6 in., and the transmitting rod was more conveniently connected to the pantagraph, and not by means of an overhung pin, as before. This made a better and more durable job than the other. With these differences, the former description applies to this, and it will always be found that this arrangement works out better than the other for the standard American engine.

Incidentally it may be added that in the case of the Old Colony locomotive the arrangement of the operator's seat described in the above-mentioned issue of the *Railroad Gazette* was used, namely, a piece of bent boiler plate above the cylinder, thus protecting the operator from injury from a flying piston or broken cylinder head. This plate was curved to fit the top of the end of the cylinder casing, but was fastened only to the frame of the engine. It served its purpose admirably.

[A set of indicator diagrams made with the rigging described by Mr. Dean on Old Colony locomotive No. 148 is given herewith. The diagrams are reproduced full size, and a table of the conditions under which they were made follows them.]

Steel Plate and Malleable Iron in Car Construction.

At the February meeting of the Western Railway Club Mr. E. W. McK. Hughes, Chief Engineer Fox Solid Pressed Steel Co., and Superintendent of Locomotives of the Northern State Railway of India, read a paper with the above title. Extracts from the paper follow:

Improvement in construction can only be effected and made successful provided it fulfills three main conditions: Greater simplicity in construction, greater economy either in manufacture or maintenance, or in both; decreased weight, increased strength, and a reduction in parts making up the whole. I do not know of any invention of late years that so meets with all the requirements to achieve success as pressed steel in locomotive and car construction. A solid pressed steel plate is produced complete and perfect at one heat, of sufficient rigidity, transversely and longitudinally, so as to do away with the use of angle irons, and thus reduce the weight and cost of manufacture.

Take for example the passenger and freight truck diagrams before us. They are composed of very few parts, and of one single material, which possess complete homogeneity, and uniform strength throughout, the quality of which is guaranteed by the shape it is pressed into. These trucks, therefore, cannot but be more serviceable. The system also possesses the recommendation of enabling the various parts to be replaced in fac simile an indefinite number of times with the certainty of perfect interchangeability, thus reducing the labor in erection at the first start, and subsequent labor in maintenance and repairs. Besides this there is the additional advantage, that, in the case of injury by wreckage, the parts are capable of being restored to their original form at a small cost; and if so badly injured as to be past repair, they are valuable scrap.

I will proceed to describe by the aid of diagrams and models the different styles of trucks for passenger and freight service. Comparing them with the hitherto built trucks with channel bars, angle irons, truss rods and bolts augmented with cast iron, malleable castings and wood, a great contrast is afforded by the simple, elegant and uniform shapes of the pressed steel trucks.

I will now proceed to notice the practical and commercial considerations bearing on the subject of pressed steel. One of the most important desiderata in connection with car construction in these days of low tariff rates is lightness. Pressed steel goes direct to this point, as it reduces dead weight to be hauled. I cannot better demonstrate this argument than by reference to actual forms now in the room; I mean these centre plates.

Mr. Hughes showed steel centre plates saving 222 lbs. per car over the cast iron plates which they replaced, or 6,660 lbs. in a train of 30 cars. He showed a steel truck for passenger cars 947 lbs. lighter than an ordinary average 4-wheel truck, saving 11,364 lbs. in a 6-car train. He showed also a freight truck designed to replace the diamond truck and weighing 1,200 lbs. less, or 36,000 lbs. saving in a 30-car train.

Diagram No. 146 illustrates a novel form of freight truck. We have nothing to compare it with, unless we take a passenger truck, for in this case we are offering for freight service a truck that might, and will, carry a passenger coach. The object aimed at in this truck has been to relieve it of the severe concussions that are delivered on the truck with a journal box rigid in the frame. This point is attained, as will be seen by placing the springs in the side frames and conveying the load through them to the journals direct by the introduction of equalizers.

This truck can be built either with or without end sills. We may compare it for weight without ends to a diamond truck. It is estimated to weigh 5,115 lbs., and the weight of a diamond truck to carry the same load (60,000 lbs.) may be taken at 5,205 lbs. Thus we have 90 lbs. in favor of the steel truck which is carrying equalizers weighing 280 lbs. In other words, we have a truck for freight service in which are contained portions that at the present time only exist in passenger service, and yet the weight is less by 90 lbs. than the ordinary rigid bolster diamond truck.

Economy in maintenance is arrived at by the use of pressed steel in car construction. A standard design having been fixed upon, each part can be produced an indefinite number of times with perfect exactitude. Spare parts can, therefore, be held, and replacements effected without delay. This is a very valuable point in the use of such material, and the further we get to a standard throughout the country, the more valuable will be the use of our pressed steel forms. Another important feature in these trucks is their elasticity, which no other form possesses to such an extent. A frame having a high degree of elasticity cannot possibly destroy itself, as a rigid built one will. If the whole train is made up of such elastic trucks, it is capable, after receiving a shock, of giving it back again, and under such circumstances little or no harm is done. I have closely watched the effects of elasticity in our trucks moving round curves and over bad roads and have been astonished at the ease with which they worked.

DISCUSSION.

Mr. SCHROYER (C. & N. W.): I would like to ask Mr. Hughes to what extent he is using these particular forms in service on the roads in this country to-day, and also if these are the forms that he has used heretofore, and if he has used them for cars of the capacity of our cars here?

Mr. HUGHES: We have not any of them in use yet in the United States. We hope to have them very soon. I have used, in India, a truck very much of that pattern, of 26 gross tons, and they have worked admirably. This pattern was so successful and so cheap that we adopted it, and we had only that one style of truck over the whole road for both passengers and freight.

Mr. SCHROYER: A centre plate in our service has not only to carry the load, but it has to take a sudden jar, and we have a good deal of backward and forward movement, and the inevitable result will be that the centre pin will break off as a result of its having this movement. Now, we have got up a centre plate with square shoulders to prevent that difficulty in our service. Mr. Hughes refers more particularly to a rigid beam truck, and a rigid beam truck does not have that motion in the bolster that we have in the swing-motion truck.

Mr. HUGHES: We do not make one single form, nor do we say that that is the best form. We are prepared to make whatever we are called upon for. So far as the lateral thrust is concerned, I think these will carry a great deal more than the cast iron ones will.

Mr. MCKENZIE: The form of the centre plate, as shown, seems to be one that works very well in cast iron. We do not have any trouble about the centre plate getting out, whether it is a swing beam or a rigid truck. I think there are many cars running that have no king bolt at all. I do not understand what figure the centre pin cuts in a centre bearing; if we can get something that will prevent the corners from breaking off, it is the thing we want to talk about.

Mr. SNOW: We used to have a great many centre pins broken, but not now. Our pin goes through the first bar of the transom, and there we put on a cast iron collar, and that leaves the centre pin all loose. We used to have it rigid, and then it used to break. We do not now have many broken transoms.

Mr. WILLIAM FORSYTH: A centre plate can be made in pressed steel which is just as good as any made in cast iron, so far as shape is concerned, and while it is so much lighter, it has a tensile strength of 55,000 or 60,000 lbs. compared with 12,000 or 15,000 lbs. in cast iron.

Mr. SCHROYER: The point that I make is the danger of having our trucks knocked from under cars as they frequently are in our service. I have offered some of the pressed steel companies to let them make us our shapes, and let us put them in the service, but they have never made them yet.

MR. FORSYTH: If Mr. Schroyer is having such an experience with the swing motion trucks, would it not be well to consider whether the swing motion truck is a good thing? I think the greater trouble from the shocks which our cars are getting now arises from the sliding of car bodies on the trucks, and I think that that trouble will be found most prevalent with swing bolstered trucks.

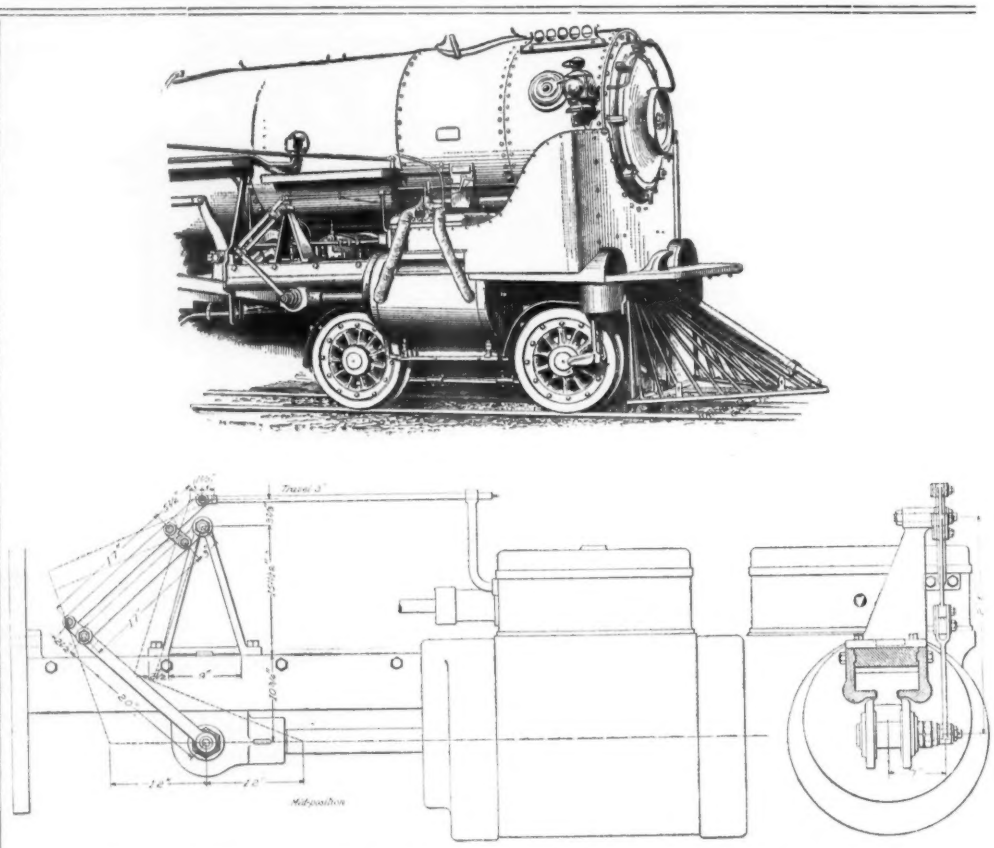
Mr. SCHROYER: Every road that has a swing motion truck has a reason for using it. I am very certain that we have. Less power is required to pull a train of cars with a swing motion truck than with a rigid truck. It is harder on rails and curves, which are questions that must be considered in the use of any truck on a railroad; and these questions were duly considered before the swing motion truck was put into service on our road. There was a time when we used the rigid truck, and it was discontinued for the use of the present swing motion truck. And while the original cost is greater, and also probably the cost of maintaining, yet is it not so much better, as to save expense somewhere else?

Mr. HUGHES: With reference to Mr. Schroyer's remarks about the trucks being knocked away from underneath the car, I understand that he does not in any way blame the pressed steel, but the shape of it, therefore the objection he raises is common to both pressed steel and cast iron. My idea is to carry the load on the outer edge; that prevents the latteral motion that some people have objection to on the truck. Now, I think you will admit that this material will stand a side shock three times as great as cast iron will.

Mr. VERBRYCK (C., R. I. & P.)—That form is the form of our cast-iron centre plate, and we are using a swing beam truck. We occasionally have a broken centre pin, but I have never yet found that trucks with this form have been driven out from under the cars.

Mr. SCHROYER: If your train crews are handling your trains as roughly as ours are now, it is certainly remarkable that they are not breaking them in this way. There is scarcely a day but we have two or three cars coming into the yards with the trucks knocked out, and it is almost invariably the case that we have to put in some intermediate sills, or put in some wheels as the result of their being skidded by the weight of the car bearing on them. When we first changed from the rigid beam truck, we used a ball and socket joint, but we found that did not help matters as to centre plates being knocked out. So we made some very deep cast-iron shoulders on these plates.

Mr. VERBRYCK: I think switchmen are about the same the world over, and if I had had much trouble about that, I think I should have found it out before now. Sometimes when lying in bed I have heard the cars come together and thought that there wouldn't be a car left on its trucks.

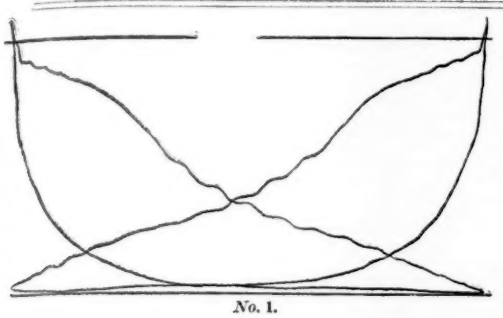


INDICATOR RIGGING FOR STANDARD 18 IN. × 24 IN. PASSENGER LOCOMOTIVE.

DESIGNED BY MR. F. W. DEAN FOR THE OLD COLONY RAILROAD.

Shops of the Wisconsin Central.

The Wisconsin Central Shops at Waukesha are very well arranged for small shops. They are in charge of Mr. John Player, Superintendent of Motive Power. The visitor will find there several interesting features. In the erecting shop the tracks are arranged side by side, each having a capacity for one engine. Traveling transversely over these tracks are two Yale & Towne cranes of 30 tons capacity. Outside of the buildings, across the ends of the tracks, travels a transfer table which is driven by electricity from an overhead wire, on the Sprague system. This table has a velocity of 250 feet per minute when unloaded, and by it and the two overhead traveling cranes locomotives can be readily trans-



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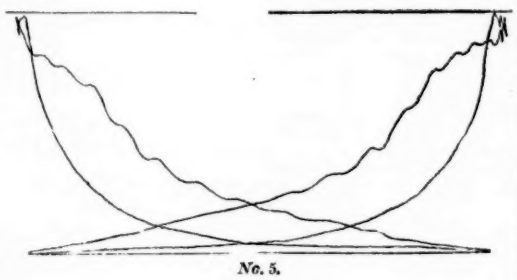

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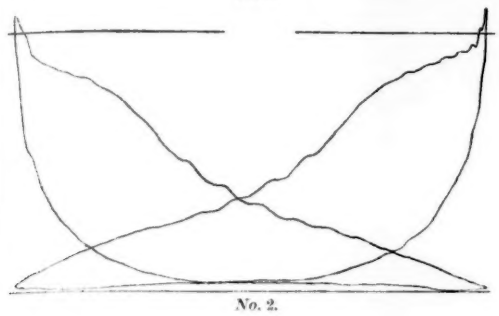

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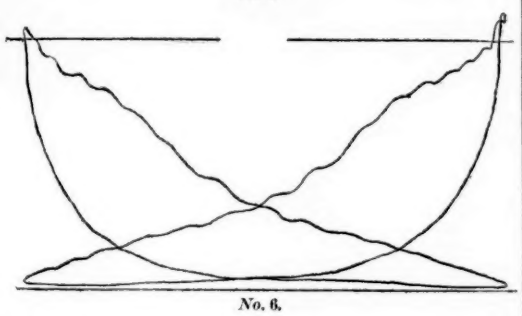

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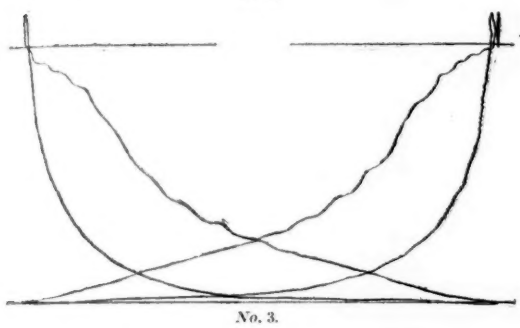

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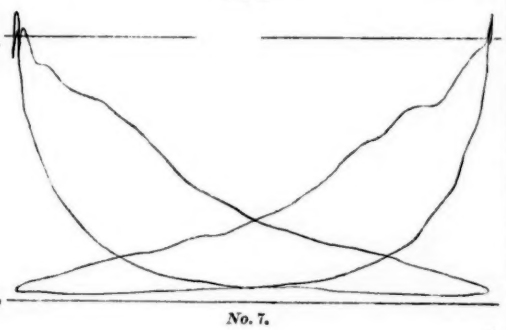

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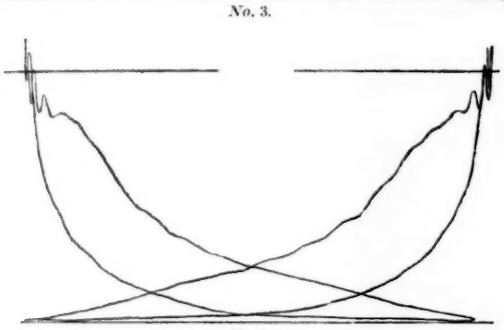

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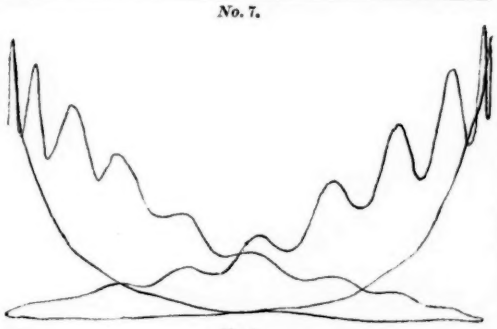

No. 8.

Number of card.	Revolutions per minute.	Cut-off. Inches.	Steam pressure. Pounds per sq. in.	Opening of throttle.	Mean effective pressure. Front.	Mean effective pressure. Back.	Horse power of locomotive.
1	168	7¼	151	Full	50.5	51.5	530
2	176	7½	155	Full	52.2	53.5	564
3	196	4¼	155	Full	35.2	35.7	422
4	200	4¼	150	Full	30.5	29.5	367
5	208	4¼	143	Full	22.7	24.5	296
6	220	7½	150	Full	46.5	46.5	626
7	308	7½	157	Full	40.2	45.0	785
8	364	...	155	Full	33.5	32.7	734

NOTE.—The spring of the indicator in each case was 100 lbs. to the inch. The horizontal line above the cards is the boiler pressure line.

INDICATOR DIAGRAMS—OLD COLONY LOCOMOTIVE NO. 148.

ferred or lifted during repairs or construction. The overhead cranes are not driven by an electric motor, but by power from the main shaft in the erecting shop. The electric current for the transfer table is obtained from an Edison dynamo in the engine room, which is driven by a large Brown engine.

The tools in the machine shop, which is in the same building with the erecting shop, are mostly new and in excellent order. The blacksmith shop is well equipped, and has large cubical contents in proportion to the number of fires, and, being properly ventilated by straight vertical stacks over each fire, it is almost entirely free from smoke. The wood-working shop is a model one of its size. The arrangements for light in the roof and the construction of the trusses are commendable. There is no iron foundry at this point on the road, but a small brass foundry has been added sufficient in capacity to furnish all of the brasses and fittings required.

All shops have their novelties in construction and methods, and this is no exception. One finds here the locomotive side rods made from bridge eye-bars, the bars being placed together and welded up, the eyes forming a satisfactory end for a solid end rod. The standard smoke stacks are made of cast iron throughout. In shape they are exactly the same as the interior stack of the double straight stacks now so much used; that is, they are smaller in diameter about one-third of the height from the bottom. The driving boxes for the locomotives are made with strips of bearing metal inserted in the cast iron box, and filled in between with babbitt. The cross heads not only have brass gibs where they bear vertically against the guides, but also on the lateral or side bearings.

One might think that new locomotives would require but little overhauling, and especially when built with an understanding that they would be used by a road having small facilities; but this is not always the case evidently from the experience of the Wisconsin Central with some mogul engines built by a prominent locomotive works. In this case, the crank pins were so small and the centre of the main rod bearing was so far from the face of the wheel that it was found impossible to put in a crank pin of those dimensions of any material which would stand any reasonable length of time; and the change in diameter of 1½ in. for the parallel bearing and 1 in. for the main bearing shows an error somewhere, as this is an enormous increase, and points to carelessness in design. On these same engines the counterbalance was so inadequate that two large balances have had to be bolted in.

This road is just commencing to use cylinder head castings of pressed steel made by the Fox Pressed Steel Co.

The Season's Work of the Rotary Snow Shovel.

Although this winter has been a remarkably open one there has nevertheless been unusual opportunity to test the capabilities of the machine snow plows in keeping open the railroads in certain regions. There has not been for years, and perhaps there has never been, such a series of severe snow blockades as have been experienced on the lines of the Southern Pacific and the Union Pacific this winter. We have already given our readers such details of the work of these machines as we have been able to collect from authentic sources.

The rotary, of which a large number are now in use, and which has been gradually developed through five or six years of actual experience, has, of course, been the one most widely used. Its first important work this season was in New Mexico; where a storm of great severity occurred in the early part of November, blockading for a time a portion of the Denver, Texas & Fort Worth. The blockade on this line was opened by the rotary, and the General Manager, Mr. Meek, was so well satisfied with its performance that he said "no well-regulated road could afford to be without a rotary."

The same storm appeared about the same time in the Western part of Kansas, blocking the western division of the Chicago, Rock Island & Pacific with snow, sand and ice. The company has, however, two rotary plows, with which the line was opened in a few hours. Later very severe storms began in the Rocky Mountains, the Sierras, and Cascades, extending from New Mexico to Washington. The Denver, South Park & Pacific was the first mountain road to feel the effects. This is a narrow gauge line, and there was but one narrow gauge rotary available to keep it open. It being a line of heavy grades and sharp curves, the work there was unusually difficult. Heavy snow slides occurred, often exceeding 20 ft. deep on the track, and the snow brought down was extremely compact and difficult to handle. Nevertheless, the rotary succeeded in getting through the obstruction with no great delay except where rocks and trees were brought down with the slides and were buried in the mass of snow. On several occasions the machine was badly damaged by meeting such obstacles, and it has been a very difficult matter to keep the line open with but one plow.

On the Colorado Midland also, there have been heavy storms with snow in some cases 13 ft. deep on the level, but it is reported that no trains have been seriously delayed as the rotary has been efficient in patrolling the line. Local accounts say that this road has not been blockaded a whole day through the season, one rotary having kept open the line of 250 miles. It was this machine that was sent down early in the season to open the Denver, Texas & Ft. Worth.

The Denver & Rio Grande has two rotaries and has been more successful than in any preceding winter in keeping its line open.

On the lines of the Central Pacific severe storms set in the latter part of November, but the road was successfully kept open for a long time with but one machine, which the company bought two years ago and had never before had an opportunity of severely testing. Eventually, however, heavier storms and snowslides of great volume made it impossible to keep the line cleared with but one machine. The General Superintendent has expressed himself as being satisfied that if he had three or four rotaries at his command no blockade would have taken place, and he states that the rotary which he borrowed from the Union Pacific to open the west end of the Salt Lake division did more work in six hours than could have been done by 500 men in a week. During these storms the rotary was in continuous service for 14 days and nights. An excellent account of the January blockades, from official sources, was given in the *Railroad Gazette* Jan. 31.

The Northern Pacific has four rotaries, and the line has so far been kept open with no delays lasting more than a few hours, and officials of the company state that practically the line has not been blockaded this winter.

This is the third winter that the rotary has been used on the line of the Oregon Railway and Navigation Company, where two are now in service, and it is claimed that they have never failed to keep the line open until one of them became disabled in the mountains a few weeks ago.

Train Accidents in January.

COLLISIONS.

REAR.

1st, on Illinois Central, at De Soto, Ill., freight train broke in two and the rear portion was run into by a following freight, badly wrecking engine and 18 cars.

1st, on Central of New Jersey, near Phillipsburg, N. J., freight train with a helper at the rear broke in two, and in attempting to recouple the two portions they collided at a curve. A closely following freight ran into the helper of the disabled train, wrecking two engines, caboose and several cars. Two men riding in the caboose injured.

3d, on East Tennessee, Virginia & Georgia, at Philips Station, Ga., a passenger train was run into at the rear by a freight train, damaging the rear car, injuring two passengers. The other passengers escaped from the car before the collision.

4th, on Chicago, Rock Island & Pacific, near Malcolm, Ia., a freight train ran into the rear of another freight in a dense fog, wrecking engine and four cars. Three drovers riding in the caboose killed, and several drovers and trainmen injured.

7th, on St. Louis, Iron Mountain & Southern, near Poplar Bluff, Mo., freight train ran into the rear of another freight, wrecking six cars and overturning the engine in the ditch. Four trainmen injured.

8th, Northern Pacific, near Almira, Wash., the foremost of two engines pushing a snow plow was crushed between the other engine and the plow, and the engineer and fireman were badly injured.

8th, on West Shore, near Fairport, N. Y., freight train

ran into the rear of another freight, doing some damage.

8th, on Rome, Watertown & Ogdensburg, near Watertown, N. Y., a freight train ran into the rear of another freight, wrecking 14 coal cars.

10th, on Galveston, Harrisburg & San Antonio, near Hondo, Tex., a freight train broke in two, and the rear section collided with the forward one, doing some damage. Two trainmen injured.

10th, on Georgia Pacific, near Henry Ellen, Ala., freight train ran into the rear of another freight, wrecking caboose and one car.

11th, on East Tennessee, Virginia & Georgia, near Bullards, Ga., a tool car containing eight laborers was pushed by an engine into a car loaded with poles standing on the main track. Both cars were wrecked. The tool car was overturned, killing one laborer and injuring four others.

11th, on Philadelphia, Wilmington & Baltimore, near Wilmington, Del., an accommodation train ran over a misplaced switch and into some freight cars standing on a side track, disabling the engine. Three trainmen injured.

11th, on Pennsylvania, at New Florence, Pa., a freight train ran into the rear of another freight, damaging engine, caboose and three cars.

12th, on Pittsburgh, Cincinnati & St. Louis, near Unionport, O., a freight (first No. 70) broke in two, and, the flagman failing to go back far enough, the rear portion was run into by the second section. The third section was flagged and stopped, but the flagman of the third section did not get back far enough, and the fourth section collided with it. Two engines, two cabooses and 12 cars damaged. A fire started, and the consumable portion of the engine of the second section and several cars were destroyed.

13th, on Cincinnati, Hamilton & Dayton, at Milton Station, O., a southbound passenger train collided with a box car which a gale had blown out of a siding on to the main track. The engine was overturned in the ditch and the baggage and express cars piled on top of it. Engineer, fireman and express messenger injured.

14th, on Philadelphia & Reading, near Snydertown, Pa., freight train ran into the rear of a preceding freight. Engine and 10 cars wrecked. Conductor killed, several trainmen injured.

17th, 7 p. m., on Cincinnati, Hamilton & Dayton, at Winton Place, O., a southbound accommodation train which had just left the station was run into at the rear by a fast express train, the engine of the latter, the "A. G. Darwin," demolishing one-half of the rear car of the accommodation, badly damaging the others, and overturning stoves or lamps sufficiently to start fire in several places. The rear car of the accommodation was a combination baggage and express car, and there were but few passengers in it. Three passengers and two trainmen killed, two passengers and two trainmen injured. The block system is in use on this portion of the road, and the collision resulted from a wrong signal given at Carthage. The operator was anxious to avoid delaying the express, and so concluded to give its engineer the caution signal instead of holding him until the block was clear. It appears that a caution signal is given by showing white by the semaphore and green by a hand lantern, and that the operator displayed the fixed white signal before he had succeeded in lighting his lantern with which to give the green signal. While he was trying to light the lantern the express train passed by.

17th, on New York, Lake Erie & Western, at Blooming Grove, N. Y., a freight train which had stopped to cool a hot box was run into by a following freight, though a flagman immediately went back. Engine and a number of cars wrecked. Brakeman killed.

17th, on Georgia Pacific, near Leeds, Ala., a freight train, the engine of which had been cut loose for the purpose of getting coal, was run into at the rear by a following freight train, wrecking the engine and several cars.

18th, on Georgia Pacific, at Riverside, Ala., a westbound passenger train ran into the rear of a freight which had stopped on a curve. Engine, caboose and three cars wrecked. Engineer killed.

19th, on New York, Lake Erie & Western, near Susquehanna, Pa., a passenger train ran over a misplaced switch and into some freight cars standing on a siding, damaging engine and 12 coaches and demolishing a number of freight cars. One passenger injured.

21st, on Missouri Pacific, at Omaha, Neb., a suburban passenger train was run into at the rear by the forward portion of a detached freight train, which was being run fast in an endeavor to evade the rear part. Several coaches smashed and the switch engine derailed. One passenger killed, conductor and seven passengers injured.

21st, on Baltimore & Ohio, at Glen Easton, Pa., a freight train ran into the rear of another freight, wrecking the engine, caboose and ten cars. Conductor killed, engineer and fireman injured.

22d, on Columbus & Western, at Salem, Ala., a freight ran into the rear of another freight, doing considerable damage. Engineer injured.

25th, Chicago, Milwaukee & St. Paul, at Deerfield, Ill., a fast freight ran into the rear of a preceding freight standing at the station.

25th, on the Pennsylvania at Claremont, Pa., passenger train standing at the station was run into at the rear by a freight train, wrecking the rear car of the passenger train for half its length. The passengers had, however, seen the headlight of the approaching freight and escaped. Fireman and brakeman injured by jumping.

26th, on Lake Shore & Michigan Southern, at Bay Ridge, O., freight train ran into the rear of a preceding freight, wrecking six cars. Conductor killed.

28th, midnight, on New York, Lake Erie & Western, at Owego, N. Y., passenger train No. 12, standing at the station, was run into at the rear by the Wells-Fargo Express train No. 14. Six passengers injured. It is said that No. 14 was entering the station at reckless speed.

29th, on Illinois Central at Milan, Tenn., freight train ran over a misplaced switch and into some freight cars standing on the side track, badly wrecking them. Engineer and fireman injured.

29th, on Georgia Southern & Florida, near Inaha, Ga., freight train ran into the rear of a preceding freight, damaging a number of cars.

30th, on Illinois Central, at Van Buren street, Chicago, a suburban passenger train running eight miles per hour struck the rear of a preceding passenger running four miles per hour. One passenger slightly injured. There was a dense fog at the time.

31st, 3 a. m., on Gulf, Colorado & Santa Fe, at Alvarado, Tex., freight train standing at the station was run into at the rear by a following freight, wrecking several cars and burning up three.

BUTTING.

2d, on Baltimore & Ohio, near Alta, O., butting collision between two passenger trains due to a misplaced switch, damaging both engines.

2d, on Missouri Pacific, near Wichita, Kan., butting collision between freight trains, causing considerable damage. Two trainmen killed.

2d, on Central of Georgia, at Eden, Ga., butting collision between two passenger trains. A dense fog obscured the signals. Both engines and a number of cars damaged. Six passengers injured.

2d, on East Tennessee, Virginia & Georgia, near Knoxville, Tenn., butting collision between northbound passenger train and a freight, wrecking both engines. Two firemen killed. The baggage car caught fire and was consumed.

2d, on Missouri Pacific, near Washington, Mo., butting collision between freight trains, wrecking the forward portion of each train. Engineer and brakeman killed.

3d, on Illinois Central, at Eskridge, Miss., butting collision between freight trains, caused by an operator's mistake. Engines and 14 cars wrecked. Engineer injured.

3d, on Baltimore & Ohio, near Mansfield, O., butting collision between passenger and freight trains, disabling both engines, deraiiing a mail car and injuring a trainman. The passenger was three hours late and the runner of the freight apparently forgot his orders.

5th, on Oregon Railway & Navigation Co.'s road, near Willows, Or., butting collision between passenger and freight trains. Fireman killed.

6th, On Cheshire Railroad, near Westmoreland, N. H., butting collision between two freight trains, doing considerable damage. Engineer and fireman killed and several other trainmen injured.

7th, on Pennsylvania near Belvidere junction, N. J., butting collision between a work train engine going to Belvidere for water and a Lehigh & Hudson coal train, wrecking both engines and a number of cars. The engineer of the work train was killed. The other engineer was uninjured.

7th, on Union Pacific, at Howell, Wyo., butting collision between westbound passenger and a freight train, on a curve, disabling both engines and damaging several cars in each train. Two trainmen injured. The freight crew had apparently forgotten all about the other train.

11th, on Western New York & Pennsylvania, near Cuba, N. Y., butting collision between a northbound and a southbound freight; one brakeman killed. It is said that the operator at Hinsdale neglected to deliver an order to the northbound freight. Engines and several cars badly wrecked.

11th, on Chicago & Northwestern, at Evanston, Ill., butting collision between passenger and freight trains, due to a misplaced switch, doing considerable damage.

13th, on Burlington & Missouri River, near Burchard, Neb., butting collision between snow plow and a freight, disabling both engines.

13th, on Pennsylvania, near Linden, N. J., butting collision between two freights, wrecking engines and several cars.

16th, on Columbus & Western, near Opelika, Ala., butting collision between two freight trains on a curve in a cut, due to misinterpretation of orders. Engine and several cars wrecked. Three trainmen killed.

16th, Central of Georgia, near Opelika, Ala., butting collision between freight trains, badly damaging both engines, and wrecking several cars. One trainman was injured.

22d, on South Carolina Railroad at Summerville, S. C., passenger train ran over a misplaced switch and into the head of a passenger train standing on the side track. Five trainmen injured.

22d, on Chicago, Burlington & Quincy, near Stanton, Ia., butting collision beween a westbound passenger train and a freight train, both of which were running at high speed. Engineer badly injured. The freight was running on the passenger train's time.

23d, on Baltimore & Ohio near Cambridge, O., butting collision between a passenger and a freight train, wrecking several freight cars. One brakeman killed. It is said that the men on the freight train misread a telegraphic order.

25th, On the Central of Georgia at Camp Hill, Ala., butting collision between freight trains. Fireman killed and seven trainmen injured. Engines and 20 cars wrecked and most of the wreck burned up. It is said a dispatcher gave conflicting orders.

30th, on the Kansas City, Memphis & Birmingham, in Memphis, Tenn., butting collision between a passenger and freight train, injuring five passengers and one trespasser.

30th, on the International & Great Northern, at Highland, Tex., butting collision between passenger trains while one of them was entering a side track. There was a dense fog at the time.

31st, 4 a. m., on Central of Georgia, at Everett, Ga., butting collision between freight trains, caused by the failure of an operator to deliver orders. Several cars wrecked.

CROSSING AND MISCELLANEOUS.

2d, on Fall Brook Coal Co.'s road, at Niles Valley, Pa., as a freight train was entering the siding the rear portion was run into by another freight bound in the opposite direction. Engine overturned in the ditch and a number of cars badly damaged. Brakeman injured.

7th, on Louisville, New Orleans & Texas, at Memphis, Tenn, collision between a passenger train and a freight entering a side track, damaging both engines, baggage car, one coach and three freight cars.

9th, on Pennsylvania road, near Glens Mills, Pa., two flat cars were mischievously started out of a siding, and they ran down grade into the head of a passenger train. The passenger runner espied the runaway cars, reversed his engine and was moving backwards when the cars struck. Engine disabled.

11th, at the crossing in New Orleans, La., a Shell Beach passenger train was run into by a New Orleans & Northeastern switching freight, damaging two coaches and the switch engine.

12th, on New York, Providence & Boston, at Providence, R. I., passenger train leaving the station struck the side of the baggage car and engine of another passenger train standing on an adjoining track, overturning the engine of the former.

13th, on Kansas City, Wyandotte & Northwestern, at Leavenworth, Kan., as a passenger train was leaving the station a switching freight was backed into one of the coaches, doing some damage.

15th, Jacksonville & Southeastern, near Centralia, Ill., collision between a freight and a construction train, wrecking a number of cars.

16th, on Louisville & Nashville, at Franklin, Tenn., freight train ran into the side of another freight train standing on a crossover.

17th, at St. Joseph, Mo., collision between Hannibal & St. Joseph and Chicago, Rock Island & Pacific passenger trains, damaging several cars of the latter and the engine of the other train.

18th, on East Tennessee, Virginia & Georgia, near Macon, Ga., collision at a "Y" between a passenger train and a switching engine, derailing the latter and disabling the passenger engine.

19th, at the junction at Glen Jean, O., collision between Scioto Valley and Ohio Southern freight trains, wrecking one engine and nine cars and demolishing a station building. Brakeman killed.

24th, on Pittsburgh & Western, near Niles, O., an engine ran into some cars standing on the crossing of the Pittsburgh, Painesville and Fairport Railroad. The concussion broke a steam pipe and the engineer and fireman jumped off. The engine then started with no one upon it and ran to Girard, six miles, where the operator (having been notified) turned it upon the side track, wrecking six cars.

25th, at Union Depot, Duluth, Minn., collision between a switching train and a freight train, damaging several cars.

29th, 2 a. m., on the Central of Georgia, at Columbus, Ga., freight train entering upon the Columbus & Western division ran into the side of a heavy freight engine, badly damaging both engines.

30th, at Elgin, Ill., a Chicago, Milwaukee & St. Paul freight and a Chicago & Northwestern freight collided at the crossing of the two roads, wrecking several cars and blocking the track all day.

30th, on Southern Pacific, at Galveston, Tex., a collision between a freight and a yard engine in a dense fog; three employés and a tramp injured.

30th, on the Nashville, Chattanooga & St. Louis, at Bolivar, Ala., a Memphis & Charleston freight ran into the side of another freight entering a side track, wrecking several cars and overturning the engine.

30th, on the Illinois Central, Sixty-seventh street, Chicago, collision between a passenger train and a switch engine, both moving very slowly. There was a dense fog at the time. Cause, misplaced switch.

31st, on Delaware, Lackawanna & Western, at Hoboken, N. J., passenger train entering the station struck an empty switching passenger train, badly damaging four cars.

DERAILMENTS.

DEFECTS OF ROAD.

2d, on Central of Georgia, near Griffin, Ga., hind truck of rear car of passenger train thrown from the track by a broken rail.

2d, on San Antonio & Aransas Pass, near Lockhart, Tex., engine of mixed train thrown from the track by the spreading of the rails. Express messenger injured.

2d, on San Antonio & Aransas Pass, near Hallettsville, Tex., a bridge over Lavaca River, which had been impaired by a freshet, gave way under a freight train, the engine and 20 cars going down, much of the wreck being carried away by the swollen stream. Three trainmen and a tramp drowned, 1 passenger killed, and 2 trainmen injured.

7th, on Missouri Pacific, near New Haven, Mo., freight train thrown from the track by a broken rail, wrecking 14 cars.

8th, on Denver & Rio Grande Western, near Battle Creek, Utah, 2 cars of freight train thrown from the track by the spreading of the rails.

9th, on Union Pacific, at Sidney, Neb., passenger train moving at speed was thrown from the track by a broken rail and overturned in the ditch. Fire broke out, and all but the two rear cars (sleepers) were burned up. Baggageman and two passengers injured.

12th, on Northern Pacific, near Hot Springs, Wash., seven cars of a passenger train were thrown from the track by a broken rail, and most of them overturned. The train was detained 24 hours. No one seriously injured.

14th, on Seattle, Lake Shore & Eastern, near Ballard, Wash., engine and two cars of a passenger train derailed by a defective frog.

14th, on Toledo & Ohio Central, at Prairie Depot, O., 10 cars of freight train derailed by a defective switch.

14th, on Louisville & Nashville near Palmyra, Tenn., the greater portion of a freight train went through a bridge which had been weakened by high water. Most of the cars were loaded with lime, which, igniting the wreck, caused a considerable fire.

15th, on New York, Ontario & Western, at Utica, N. Y., four cars of a switching freight train were derailed and thrown across the track by a defective switch.

16th, on Louisville & Nashville, at Pulaski, Tenn., engine of passenger train derailed by a defective switch.

18th, on East & West Alabama, near Opelika, Ala., engine and five cars of a freight train thrown from the track by a broken rail.

19th, on Burlington & Missouri River, near Seward, Neb., yard engine thrown from the track by a broken rail and upset. Firemen killed, engineer injured.

25th, 2 a. m., on the Rio Grande Western, near Sunny Side, Utah, passenger train running 15 miles an hour derailed by broken rail. One passenger car overturned; conductor and four passengers injured.

27th, 8 a. m., on the Louisville, New Albany & Chicago, near Carmel, Ind., passenger train derailed by spreading of rails near the trestle over Wilkinson Creek. Three passenger cars, including one sleeper, went down into the creek and were partially burned by fire which immediately broke out. Six passengers killed and 26 injured. The coroner's verdict states that the outer rail on the track where the derailment occurred was not securely fastened, some of the sleepers being unsound.

DEFECTS OF EQUIPMENT.

1st, Norfolk & Western, near Ada, W. Va., two cars of a freight train derailed and wrecked by a broken wheel, at the foot of a four-mile grade.

1st, on Pennsylvania road, near Allegrippus, Pa., a wheel under a car in a freight train broke, and seven cars, including two tank cars containing oil, were smashed, some of the débris blocking the adjoining track. Owing to the spilled oil on the ground no locomotive could pass for several hours.

2d, on New York Central & Hudson River, near Yonkers, N. Y., an axle under a car of a freight train broke and several cars were wrecked, one of them going into the Hudson River.

7th, on Boston & Albany, in East Boston, Mass., four rear cars of freight train derailed by the breaking of a brake beam, demolishing a flagman's shanty.

13th, on George's Creek & Cumberland, near Lonaconing, Md., axle under car of freight train broke, wrecking 16 cars. Brakeman killed.

16th, on Central of New Jersey, at Plainfield, N. J., a wheel under a car in the forward part of a freight train broke, causing 20 cars to be piled up at the foot of an embankment in a very bad wreck.

20th, on Georgia, Southern & Florida at Mossy Creek, Ga., several cars of a freight train derailed by a broken truck.

21st, on Louisville & Nashville, near Edgefield Junction, Tenn., freight car derailed by broken truck.

21st, on International & Great Northern, near Galveston, Tex., passenger train derailed on a trestle by a broken truck under a mail car. The tender, mail, express and two passenger cars were tipped off the trestle and thrown on their sides in a marsh. Eight passengers injured.

28th, Pittsburg, Cincinnati & St. Louis, Wellsburg, W. Va., 10 cars of a freight train derailed by a broken truck.

30th, on the Central of Georgia, near Smarrs, Ga., two cars of a freight train derailed by a broken truck.

30th, on Chicago, Rock Island & Pacific, near Gallatin, Mo., eight cars of a freight train derailed by a broken truck.

NEGLIGENCE IN OPERATING.

4th, on Western New York & Pennsylvania, near Shippens, Pa., a freight train, which had become uncontrollable in descending a heavy grade, dashed down the incline and was derailed, three box cars and 29 tank cars being piled up in a bad wreck. Two brakemen killed, one injured.

5th, on Fall Brook Coal Co.'s road, near Wellsboro, Pa., the derrick of a wrecking car struck the top of a bridge, causing it to give way. The car went down with the bridge, killing two employés, and injuring 18 others.

7th, on New York, Lake Erie & Western, near Burns, N. Y., a Lehigh Valley freight was derailed at a point where track repairs were in progress, damaging engine and 15 cars. A flagman sent out failed to give proper warning. Two trainmen injured.

13th, on Norfolk & Western, near Crewe, Va., engine and 14 cars of a freight train derailed where some rails were out for repairs. It is said that a proper danger signal was exhibited by the section master.

14th, on Baltimore & Ohio, at Parkersburg, W. Va., three tank cars of a switching freight were backed off the end of the track and badly damaged.

21st, on the Central of Georgia, at Upatoia, Ga., eight cars of a freight train derailed and ditched by a loose rail at a point where track repairs were in progress.

21st, about 11 a. m., on Long Island Railroad, near Blissville, N. Y., a westbound passenger train approaching the drawbridge over Dutch Kills was not controlled, and the forward truck of the engine ran off the end of the rails on to the sleepers of the draw span. The engineer ran past the distant signal without noticing that it was at danger, and also failed to heed the home signal, though he came to himself several rods before reaching the opening, and tried to stop. The draw tender had seen the situation, however, and took measures to close the draw, and had nearly succeeded in doing so before the train struck it.

24th, 6:30 p. m., on New York, New Haven & Hartford, near Naugatuck Junction, Conn., engine and three cars of the eastbound Shore Line express were thrown off the track at the derailing switch at the approach to the drawbridge over the Housatonic River, the engineer having disregarded the signals. The bridge was closed, but the rails had not been fastened.

24th, on the Long Island Railroad at Garden City, L. I., passenger train derailed by misplaced switch. The locomotive was overturned and thrown down an embankment.

28th, on Central New England & Western at Canaan, Conn., an engine attempting to make a running switch was derailed.

30th, on Florida Central & Peninsula, at Tallahassee, Fla., freight train became uncontrollable while descending a grade and 13 cars were derailed and wrecked.

UNFORESEEN OBSTRUCTIONS.

1st, on Atchison, Topeka & Santa Fe, near San Juan, Col., passenger train derailed and engine overturned by running into a landslide. Engineer killed.

1st, on St. Louis, Arkansas & Texas, near Wabaseca, Ark., a passenger train ran into some mules and the engine and baggage car were derailed and ditched.

3rd, on the Atlantic & Pacific, near Winslow, Ariz., freight train derailed by cattle on the track. One brakeman injured.

3d, on Wabash, at Monticello, Ind., engine of freight train damaged by a large rock said to have been maliciously placed upon the track.

5th, on Shenandoah Valley road, at Chew's Switch, W. Va., a freight train was turned on to a spur track by a switch which had been maliciously misplaced, and ran off the end of the track into an embankment. Engine and eight cars wrecked. Two trainmen injured.

6th, on Shenandoah Valley, near Hagerstown, Md., freight train derailed by a rock which had fallen upon the track. Engine badly wrecked and two trainmen injured.

6th, on St. Louis, Iron Mountain & Southern, near Little Rock, Ark., engine of freight train derailed and damaged by a heavy chain which had been maliciously placed on the rails.

8th, on Boston & Maine, at South Lawrence, Mass., freight train derailed by an obstruction which had been maliciously placed upon the track, wrecking engine and six cars. Brakeman injured.

12th, on New York, Lake Erie & Western, near Campville, N. Y., a passenger train ran into a tree which had been blown down across the track. The headlight of the engine was torn off and a number of windows smashed.

13th, on Lake Erie & Western, at Wagner's, Ind., a northbound express train ran into a fallen tree, derailing engine, baggage and express cars and one coach. Two trainmen injured.

14th, on New York, Chicago & St. Louis, near Townsend, O., a freight train ran into a tree which had been blown down across the track, wrecking engine and 14 cars.

19th, on Missouri, Kansas & Texas, at Waxahatchie, Tex., engine, tender and baggage car of passenger train derailed at a switch which had been tampered with.

21st, on Philadelphia & Reading, near Shamokin, Pa., a freight train ran into a landslide. The engine and 10 cars were derailed and thrown into a creek, killing the engineer and injuring a brakeman.

23d, on Union Pacific, near Baker City, Or., rotary snow plow pushed by two engines derailed, killing conductor, engineer and fireman. Engines and plow badly damaged.

25th, on the Denver & Rio Grande, at Monument, Colo., an express train of seven cars, about to stop at the station, was overturned by the wind. Sixteen passengers were injured. Three of the cars immediately took fire, but by heroic efforts the trainmen extinguished the flames before any person was burned.

25th, on the Union Pacific, near Berthoud, Colo., freight train derailed by sand which had drifted on the track. Engineer and fireman buried under the engine and burned to death.

25th, on the Denver & Rio Grande, at Pring, Colo., freight train derailed by sand which had drifted on the track.

25th, on the Western New York & Pennsylvania, at Oil City, Pa., passenger train derailed by a switch which had been maliciously misplaced and spiked. The target showed all right.

26th, on Southern Pacific, near Toano, Nev., snow plow pushed by three engines derailed. Fireman killed, engineer injured.

28th, on Texas & Pacific, at Santo, Tex., engine and seven cars of a freight train derailed by running over a mule. One brakeman injured.

30th, 4 a. m., on Texas & Pacific, at Seymourville, La., freight train derailed by a cow, wrecking 13 cars, killing two trainmen and injuring three. The wreck took fire and was burned up.

UNEXPLAINED.

1st, on Northern Pacific, near Thompson's Falls, Mont., passenger train derailed at a switch and thrown in the ditch. The baggage car caught fire, but the flames were quickly controlled. Several passengers injured.

2d, on St. Louis, Arkansas & Texas, near Pine Bluff, Ark., passenger train derailed and partially wrecked. Engineer killed, three other trainmen injured.

6th, on New York, Lake Erie & Western, at Port Jervis, N. Y., caboose and a car of a freight train entering a siding derailed and overturned.

6th, on Louisville, New Orleans & Texas, near Centreville, Miss., four cars of freight train derailed, injuring a brakeman.

7th, on New York Central & Hudson River, near Lockport, N. Y., eight cars of freight train derailed.

7th, on Union Pacific, near Troutdale, Ore., dining car and one coach of passenger train derailed and damaged.

8th, on Ohio River road, at Friendly, W. Va., a freight train was derailed near a trestle and a number of cars broke through and fell to the river.

8th, on Louisville & Nashville, at Finchtown, Ky., empty engine derailed and upset. An employé was killed; fireman and another employé injured.

11th, on Northern Pacific, at Duluth, Minn., engine of switching freight derailed and damaged.

13th, on Pennsylvania, near Iselin, N. J., engine and four cars of freight train derailed and damaged. Engineer injured.

14th, on New York, Lake Erie & Western, near Laurel Run, Pa., freight train derailed.

15th, on Union Pacific, at Hampton, Wyo., the express, baggage car and one coach of a passenger train were derailed at a switch and thrown over an embankment. Conductor and nine passengers injured.

15th, on East Tennessee, Virginia & Georgia, near Heiskills, Tenn., two cars of freight train derailed.

16th, on Kansas City, Ft. Scott & Memphis, near Mansfield, Mo., engine and four cars of freight train derailed and wrecked, the locomotive being overturned. One trainman killed, three injured.

17th, on Columbus & Western, near Gold Hill, Ala., engine and several cars of a freight train derailed.

20th, on Cleveland & Canton, at Canton, O., engine of wrecking train derailed at a curve and overturned into a ditch. Two brakemen injured.

20th, on Cleveland & Canton at Barr's mills, O., engine and several cars of a freight train derailed.

21st, on Alabama Midland, near Gordon, Ala., engine and six cars of accommodation train derailed and wrecked. The engine, which was running tender first, was overturned. Engineer and fireman killed.

22d, Central of Georgia, at Dadeville, Ala., freight train derailed.

23d, on Northern Pacific, at Rice's Point, Minn., a sleeping car on a passenger train was derailed at a switch and turned over upon the engine of a St. Paul & Duluth passenger train, badly damaging the car.

24th, on the Pennsylvania, Gallitzin, Pa., car in a freight train derailed.

24th, on Pittsburgh, Ft. Wayne & Chicago, at Kenwood, Pa., engine of limited express jumped the track while running about 20 miles an hour. Baggage car and one sleeping car also derailed.

24th, on Chicago, St. Paul, Minneapolis & Omaha, in Duluth, Minn., two cars in a freight train derailed and overturned.

25th, on the Denver & Rio Grande, at Blue Canyon, Col., freight train derailed; engineer killed.

25th, on St. Joseph & Grand Island, near Troy, Kan., engine and 20 cars of a freight train derailed and fireman killed.

26th, on the Ohio, Indiana & Western, at Muncie, Ill., several cars of a passenger train derailed at a switch. They struck some freight cars on a side track and all were badly damaged.

27th, on Cincinnati, Hamilton & Dayton, at College Hill Junction, O., four cars of a passenger train derailed.

28th, on Cleveland & Pittsburgh, at Empire, O., two cars of a freight train going on to a siding derailed.

30th, on Boston & Maine, near Canaan, N. H., engine and three cars of a fast freight derailed, making a bad wreck.

OTHER ACCIDENTS.

4th, on Baltimore & Ohio, at Benwood Junction, W. Va., engine of freight train exploded its boiler when passing the station, injuring the engineer and fireman.

13th, on Houston & Texas Central near Perry, Tex., a freight train loaded with cotton caught fire and before it was extinguished communicated the flames to a station building and several other cars, 200 bales of cotton being consumed.

13th, on the Pittsburgh & Lake Erie, near Douglass, Pa., engine of construction train exploded, damaging engine and caboose and tearing up the track. The water had got low and the crown sheet was overheated. Brakeman killed and four trainmen injured.

23d, on St. Louis, Alton & Springfield, near Summerville, Ill., engine of a freight train blew out a plug, the escaping steam driving the engineer and fireman to the rear of the tender. The engine broke away from the train, and ran uncontrolled for three or four miles, when the engineer succeeded in making his way back to the cab and bringing it to a stop.

24th, on Louisville & Nashville, near Bakers, Tenn., a tube in the boiler of a locomotive of a freight train collapsed, scalding the engineer. A brakeman was injured by jumping off.

30th, on Norfolk & Western, near Wellsville, Va., tender and eight cars of a freight train partially wrecked by the explosion of crown sheet of locomotive, the water being allowed to get too low. Fireman scalded.

A summary will be found in another column.

Metallic Grain Door.

The grain door illustrated here has been brought out to prevent the destruction which seems to be the especial delight of the laborers who unload grain cars by contract. With the ordinary wooden door the quickest way to get at the grain is to demolish the door with an axe or crow bar. As a saving of time with the contractors means an increase of profit, the doors are seldom returned with the car. With the metal door the quickest way to get at the grain is to open the door in the manner intended in its legitimate operation, and any attempts to batter it with bars and axes will not only prove futile but also operate against the contractor, as he will eventually have to open the door in the way intended, because it cannot be battered down or removed from the outside, and it is not to be supposed that it will operate easier after it has been hammered.

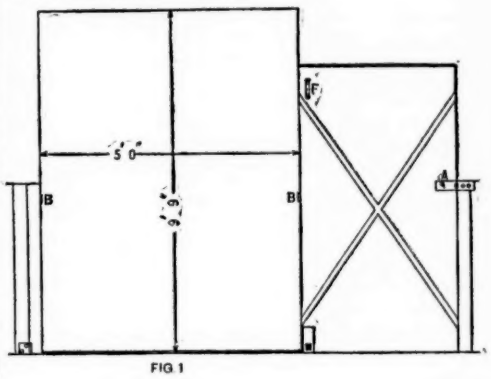

FIG. 1

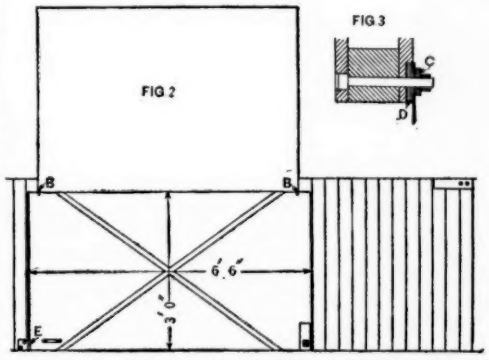

FIG. 2

FIG. 3

Five hundred of these doors are in use on the Michigan Central road. In construction it consists of a steel plate with diagonal corrugations as shown. It is hinged at *C* as shown in figs. 1, 2 and 3, on a ¾ inch bolt, and has a bearing on a washer *D*. Fig. 1 shows the door swung open and held by a socket *A*. Fig. 2 shows the door rotated down to a closed position, and held securely by the hooks *B* and the socket *E*. *F* is a ring riveted to the door by which to lift it. Other details of its construction are shown by the drawings. This door is manufactured by the Metallic Grain Door Co., Detroit, Mich.

A New Car-Wheel Works.

A new wheel foundry has been built in Milwaukee for the manufacture of a superior grade of chilled wheels, having as a basis the patents of Mr. J. N. Barr, Superintendent of Motive Power, Chicago, Milwaukee & St. Paul. The works are a short distance from Milwaukee. The buildings consist of two large structures with a covered court between, the whole frontage being 220 ft. and the depth 145 ft. The buildings are frame, with wood and corrugated iron covering. There are four large cupolas of special design by Mr. Barr, two located in each building. The blast is furnished by a Sturtevant blower driven by a stationary engine of the Corliss type. Power elevators are used to lift the fuel and iron to the charging stage. The cupolas are separated from the foundry by a brick wall. Storage bins for coke and coal have been built in close proximity to the larger buildings. In the foundry there are excellent wheel pits located within the range of a swinging crane. Tracks are laid to transport the melted iron to the various parts of the foundry, and these will be worked automatically by the man in charge of the filling of the ladles. The number of floor men will thus be materially reduced. This foundry is to be run upon a systematic basis, and all of the different ladles of metal are tested both for depth of chill and general characteristics of the iron. On the front of the wheel foundry is arranged a standard wheel testing apparatus in which tests of the different lots of wheels will be made. This company intends to do only a first-class wheel business, and to that end will purchase only the best quality of iron. It is using only old wheels and Salisbury iron with a little ferro-manganese. Those who have been using wheels made in a contracting chill and of first-class material find that the increased mileage, safety and uniformity of such wheels more than repay for the additional cost of the good material; and it is proposed by the Milwaukee Wheel & Foundry Co. to build up a business based upon a belief that the best wheel is the cheapest in the end. Recently a wheel maker who visited the new works said to the writer that, proud as he felt of his own wheels, to which he had devoted a great deal of attention, he was compelled to say that the wheels shown him, which were made at this foundry, were superior to any he had ever seen or any he had ever been able to produce.

Car Heating.

The new fast mail trains soon to be put in service on the Union Pacific are to be equipped with heating apparatus by the Consolidated Car-Heating Co. The trains will comprise 30 cars and 45 engines. Six of the cars are now being built at Pullman. It is said that these trains will carry no passengers, consisting simply of mail cars. The apparatus for heating will be in all particulars of the latest designs of the company, with which considerable success has been had in the Northwest this winter.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

President Blackstone, of the Chicago & Alton, feels so badly about the difficulty of making 8 per cent. under the present system of reckless confiscations, that he would like to sell out to the government and receive 3 per cent. bonds in exchange. At what price, he does not state.

On the efficiency of the link as compared with other valve motions, some information was brought out at the last meeting of the Western Railway Club with reference to the Wilson, Wolff and Lehigh Valley valve motions. Nothing with respect to the comparative economy of locomotives fitted with such gears which is of any value was presented; but with regard to wire drawing, back pressure, and compression, it was shown that all of these gears were an improvement upon the Stephenson link motion: however no conclusion was arrived at which would enable one to say that either of them, all features of the question being considered, was more advisable for practical use than the Stephenson link motion. It is impossible for the general reader of the papers and the discussions to obtain so satisfactory an idea of the scope of the information presented as was obtained by the members present, owing to the large number of drawings of the details of the gears and the indicator cards which were exhibited. Among the novelties were some indicator cards taken from the latest compound locomotive Worsdell at speeds of 75 to 86 miles per hour (presented by the *Railroad Gazette*), they being probably the highest speed locomotive indicator cards yet taken, and Mr. Worsdell may well feel pleased with his achievement. These cards will soon appear, together with information relative to them, in these columns.

There seems to be a good deal of agitation in favor of some modification of the long and short haul clause. Senator Paddock has introduced a bill to that effect, and the Inter-state Commerce Commission has been ordered by the Senate to make investigation into existing evils under operation of the law. There is no doubt that the law as it stands does to some extent interfere with the marketing of products. If the through rates between large centres, remote from one another, cannot be lowered without lowering intermediate rates also, they will be kept at an unnecessarily high figure. The rates on heavy through business, which is specially cheap to handle, are, by the provisions of the law, artificially kept up to the standard which is profitable on local business. This, as far as it goes, is an evil. On the other hand, the law undoubtedly does good by checking some of the discrimination previously exercised in favor of cities and against the country. The advocates of the law, three years ago, looked only at the possible good, and did not see the probable evil connected with it. Just now some of them see the evil more strongly than the good. It is hard to say which outweighs the other. It is probable that a vacillating system of legislation, with the law sometimes hard and sometimes lax, would combine all the evils of either alternative, with little or none of the good. The worst difficulties are in the process of adjustment to a law, rather than in the final adjustment itself. We were opposed to the short-haul clause in its present form, and thought its passage a mistake; but we should regard it as a mistake to tinker it in the way which some people desire to-day, with the inevitable chance of its being tinkered in some other way by each successive Congress.

Elsewhere in this issue will be found an abstract of a paper and discussion on steel plate and malleable iron in car construction. This subject is now one of much interest to all, as there are projects on foot by several car works to build steel freight cars. One prominent car company has now a design for a steel freight car ready for introduction as soon as the price of material admits and opportunity offers. The first lull in the demand for wooden cars will bring out this design. A new steel car company has been organized in Chicago, and shops will soon be built. Iron wrecking cars, special cars and cabooses are now being built by firms manufacturing machines for railroad work, and many indications can be mentioned of progress in the direction of a metal car. The channel-iron bolster has displaced the wooden bolster in the truck, the metal brake beams are driving out the wooden beams, and at least three roads are now carefully considering the feasibility of using iron instead of wooden car sills. Therefore, owing to this probable improvement in freight car construction, all information bearing on the use of steel plate and malleable iron is timely. Estimates as to the cost of metal cars based on the present price of material range from 25 to 100 per cent. higher than wooden cars now used. The dead weights of such metal cars vary almost directly with the price, the lowest estimate being about 5,000 pounds each, lighter than the 60,000-pound wooden cars of corresponding dimensions. The carrying capacity of steel cars is considerably higher for less weight and equal dimensions. There is a greater interior width and height for the same external dimensions. The question of repairs has always been a great bugbear when metal cars and trucks have been brought up for consideration. It has been supposed that the cost of repairs in case of wrecks would be greatly increased, and that a different class of men would be required. This matter can be best settled by actual trials of well-designed cars, and it will not be long before some such will be put into use. They may not be entirely of metal, but will be largely so. The metal cars that have been running on the New York Central are in good condition after 17 years of service.

Train Speed in England and America.

Under the heading "First Cost in Railroad Construction," a correspondent sends us some interesting facts in regard to present railroad history in England. The Midland Railway seems to be giving up the race for supremacy in train speed to the Northwestern and Northeastern lines. The Northwestern was built before people had much faith in the powers of the locomotive. An unnecessarily high cost was thus incurred. The Midland, coming later, had the advantage of cheaper construction. For the time being this made a great difference. But when traffic, especially passenger traffic, grew up to the full capacity of the roads the superior location of the Northwestern began to tell. The temporary advantage of the Midland proved a permanent disadvantage. The heavy grades and sharp curves which saved money when traffic was small proved a source of loss when it grew large, and rendered it impossible to compete with the better route in running fast trains. What has so often been felt disastrously by narrow-gauge roads showed itself in a less degree, but in the same general fashion, when a standard gauge road was located on radically different principles from its immediate rivals.

All this is explained in detail by our correspondent in an interesting and instructive manner. But when he comes to apply the lesson to America, we cannot wholly agree with him. The Midland runs slower than the Northwestern, and the American roads run slower than the Midland; but it does not follow that the reasons for the difference are the same in the two cases, or that the lessons from one set of differences apply to the other. Train speed is limited by two sets of causes; by what the railroads can do, and by what the public can pay for. As between the Midland and Northwestern, it is the former factor which is decisive, as between America and England, it is the latter.

There is a good deal of public misapprehension in this matter. While our standard of fast train service is far from being equal to that of England, the difference is not so much in what we *can* accomplish as in what we *do* accomplish. Our best performances need not shun comparison with the English. The Baltimore & Ohio time table between Washington and Baltimore, at its very best, just about equaled the exceptional English runs at their best; the Baltimore & Ohio between the same points to-day stands at about the highest figure which the English companies have been able to maintain permanently. Fifty-three or 54 miles per hour represents about the maximum attained on either side of the water as a regular thing. The difference is that there are only a few lines in America which furnish such speeds or anything like them, while in England they are fairly numerous.

But this is a difference in demand rather than in supply. There are quite a number of lines in thickly settled parts of our country which could run trains at 50 miles an hour if it could be made to pay. There is a much larger number on which a comparatively slight expenditure would put them in condition to do fast running. The introduction of a few safety appliances, and notably the elimination or protection of facing point switches would furnish about all the change that was needed in a great many cases. It is in these particulars, rather than in location, grades, and other matters which are costly to change, that the difference between our roads and the English is chiefly to be found. The excellence of English location is usually overestimated. As a matter of fact, the English roads do not avoid grades. They avoid grade crossings; but that is a radically different thing. Of the lines which participated in the race to Edinburgh, the East Coast route was the only one which had a thoroughly easy location. The Northwestern, in some parts, runs through so difficult a country that not even the most lavish expense could save it from at least one rather bad spot. The Midland is, of course, far worse. There are no general statistics of grades and curves in England: but it is safe to say that English lines are not nearly so good in these respects as most people assume.

England's pre-eminence in fast train service is due to the enormous demand for such service at remunerative prices, rather than to the exceptional facilities enjoyed by the railroads in meeting it. The population is dense, a most important factor in this matter. The lines were so situated that a great deal of low class traffic could go by water. The managers were, therefore, obliged to devote more of their time and attention to passenger business than was the case in America. While England's tonnage is much less than ours, her number of passenger journeys is nearly twice as great. The road which will provide the best facilities can get full train loads and plenty of them. The withdrawal of trains by the Midland, as described by our correspondent, represents a want of physical capacity to meet the chance for profit—a failure of supply of fast transportation to meet the demand.

Of such failure in America, and for such reasons, we can hardly think of an instance. We have one case where the concentration of population in large cities not far apart corresponds in some measure to that of England, and creates a corresponding demand for train service. The cities are New York and Philadelphia: the way in which the demand is met conforms fully to the English standard. Two other instances may be cited of pairs of cities not far apart, Baltimore and Washington, Boston and Providence. In each case we believe that our showing is as good as that between English cities of corresponding size and population. Our railroads are able to furnish the cities with the fast train service which they can pay for.

But the cities generally cannot, or will not, pay for it. They are too far apart to furnish train loads on the English scale. A reduction of an hour or two does not develop traffic between distant points in the same way that a reduction of ten or twenty minutes develops short distance passenger movement. It is a fallacy to say, the greater the distance the greater the necessity for speed. It is on short journeys, taken in the daytime, that quick transit is a commercial advantage. If a man must take a sleeping car anyway, the difference between eight hours and ten is inappreciable. A slight difference in comfort means more than a decided difference in speed.

The passenger demands heavy equipment in the form of dining cars, etc., rather than the saving of a few minutes time. It is a noticeable fact that many of the moderately fast long distance expresses have failed to maintain themselves. In 1888 the Burlington had an express from Chicago to Denver which spent but one night on the way instead of two; to-day the traveler seeks for it in vain. The traffic between Chicago and St. Paul furnishes a marked instance of the apparent absence of commercial demand for speed. The Chicago, Milwaukee & St. Paul has the start of its competitors in the matter

of safety appliances to such an extent that if fast through traffic were worth fighting for it could have an almost overwhelming advantage: yet it contents itself with conforming to the somewhat low standard which is within the ability of its competitors. The fact is, that there is so little money in first-class through traffic on most lines, that it is hardly worth fighting for.

If the view here maintained is correct, the cause for the relatively small number of very fast trains in America is not to be sought in railroad location or management, but in the absence of commercial demand. Our best roads can do as well as those of England; our roads, as a whole, can do a great deal more than their patrons can pay for.

Design of Locomotive Details.

Locomotive builders are continually looking forward to a more uniform design of locomotives. Probably every one of them thinks that his own designs are nearer to the most desirable standard than are the designs of his competitors. Most manufacturers would like to govern the designs used by the different railroad companies. That is, they would like to furnish the standard locomotives of the different roads from their own experience; but until some builders pay more attention to the construction and design of details, the day will be put off indefinitely when railroad companies will adopt as a standard the designs of such locomotive shops.

The traveler among railroad shops finds ample evidence of carelessness in design and construction in locomotive shops, which is not conducive to entire confidence on the part of railroad managements. Several instances have recently been brought to attention. Two or three of the "crack" engines built last year were so defective that it was almost impossible to keep them in service for any great length of time. Between the heating of journals, the leaking of boilers, the rapid wearing of the link motions, and use of poor material in the running gear, the locomotives were far from being what they were represented to be.

A few days since attention was called to a crank pin for a mogul engine, which was not at all of the proper dimensions, and was so inadequate that the diameter had to be increased over one inch before it could be made to stand service; and on the same engine the counter-balances were at least 30 per cent. out of the way. In another instance a new locomotive boiler exploded, and in still another, soft links and too close fitting of driving boxes caused wearing and heating in parts that ought to be most durable.

All of these defects show either carelessness or lack of appreciation of the demands of actual service by some of the builders. There is an objection among some locomotive manufacturers to the employment of an inspector who has had a good railroad experience, but it would seem that only such an inspector would be of any use in deciding upon the myriad of small matters which go to make up a locomotive that can be satisfactorily and readily run from the time of the first trip without requiring continual side-tracking and overhauling and other petty annoyances. Specifications for locomotives usually have a clause intended to cover and include all parts necessary to make a good locomotive ready to be put into regular service, and yet the railroad companies many times have to overhaul locomotives built under such specifications considerably before they are fit to run.

It is very desirable that locomotive builders should lead in all matters of design and construction. In their hands lie the power to do so and the opportunities to obtain information. All the officers of such companies have their energies and time devoted solely to design and construction of engines, and from them should be expected better arrangements of parts and better workmanship than from the officers of railroad companies themselves, who have an endless variety of matters to attend to. In stationary and marine engine work the builders are leading, not the steam user or the steamship company, and there is no reason why the locomotive builder should not be as well able to design loocmotives for railroad companies as the builder of marine engines is for a steamship company. As it stands to-day, the railroad companies are endeavoring to procure designs that are more satisfactory than those furnished by the locomotive builders, while the reverse of the situation is natural and proper.

Net Earnings in 1889.

When the results of the year 1888 came to be summarized, we had an increase in gross earnings over 1887, but a decrease in net earnings. For 1889 the showing is far better. The increase in gross earnings has been continued, without a corresponding increase in operating expenses. The percentage of increase of net earnings is far greater than that of gross earnings. Both the *Financial Chronicle* and *Bradstreet's*, in their last issues, present detailed evidence of this fact. The statistics furnished by the *Chronicl* are wonderfully complete, when we consider how short a time has elapsed since the end of 1889. We are given full returns for three-quarters of the railroad mileage of the United States, and eleven months' figures for several other important systems. Roughly speaking, five-sixths of the railroad business of the country is covered by these tables. The Canadian Pacific, Grand Trunk, Mexican Central and Mexican National are the only roads outside of the United States included in the table. The general results are as follows:

GROSS EARNINGS.

	1889.	1888.	Differences.	P. ct.
13 Trunk lines	$226,071,770	$215,645,587	+ $10,426,183	4 8
14 Middle Western	34,851,071	32,119,519	+ 2,732,452	8½
15 Northwestern	102,740,679	94,876,154	+ 7,864,525	8¼
16 Southern	82,345,435	76,840,838	+ 5,504,597	7
15 Pacific systems	124,555,767	119,264,266	+ 5,291,501	4½
31 Southern roads	77,382,833	68,856,214	+ 8,526,619	12½
20 coal companies	105,597,532	111,275,580	— 5,678,048	5
17 East & Midland	52,876,168	50,125,823	+ 2,750,345	5½
2 Mexican roads	9,996,415	8,179,222	+ 1,817,193	22
Total, 143 roads	$816,418,570	$777,183,203	+ $39,235,367	5
11 months (11 roads)	40,059,940	36,430,281	+ 3,629,659	10
Grand total (154 roads)	$856,478,510	$813,613,481	+ $42,865,026	5¼

NET EARNINGS.

	1889.	1888.	Differences.	P.c.
13 Trunk lines	$72,726,491	$66,873,945	+ $6,552,549	10
14 Middle West	12,895,630	10,975,101	+ 1,920,529	17
15 Northwest	37,540,289	27,473,552	+ 10,066,737	37
16 Southw	27,217,541	21,225,253	+ 5,992,288	23
15 Pacific sys	46,333,332	42,240,572	+ 4,092,760	10
31 South. roads	25,960,970	22,438,347	+ 3,522,623	16
20 Coal roads	30,922,535	34,540,986	+ 3,608,451	10
17 East and Mid	17,971,747	17,213,288	+ 778,459	5
2 Mex	3,491,158	2,419,305	+ 1,071,855	44
143 Total	$275,789,696	$245,400,349	+ $30,389,347	12
11 mos. 11 roads	12,483,986	10,413,899	+ 2,070,087	20
Total 154 roads	$288,273,682	$255,814,248	+ $32,459,434	13

These figures are far more instructive than any comment which we can make upon them. Perhaps the most surprising thing about them all is the universality of the gain. The only group which shows a loss is the coal roads. Of those which gain, all but the New England group show a greater increase in net earnings than in gross. The extraordinary increase of 37 per cent. in net earnings of Northwestern roads is more than half due to the Burlington system, which was subject to specially adverse conditions in 1888; but after making due allowance for this, enough remains to be quite striking.

There is one fact to which neither the *Chronicle* nor *Bradstreet's* calls attention, but which deserves special notice in this connection. The increase in earnings has not been followed by an increase in values. The stocks to-day stand about where they did a year ago. Gains and losses nearly balance each other. Taking the figures at the close of last year, before the present temporary depression, we find the changes in the course of the year 1889 in the stocks of the leading roads to be as follows:

	Jan. 1.	Dec. 31.
Trunk lines:		
Baltimore & Ohio	86	101
Boston & Albany	201½	217
Canada Southern	52½	54⅞
Erie	27½	29⅝
Lake Shore	104⅛	104⅝
Michigan Central	87½	94¾
N. Y. Cent. & Hudson	108	107
Pennsylvania	53¾	53⅛
Coal roads:		
Del., Lack. & Western	144⅛	135½
Delaware & Hudson	132	147¼
Lehigh Valley	54⅜	53
New Jersey Central	95¼	125½
N. Y., Sus. & West	9⅛	7⅛
Phila. & Reading	49	38⅜
Western and Southwestern roads:		
Atch., Top. & S. F.	58	33⅜
Chicago, Burlington & Quincy	110⅛	106¾
Chicago, M. & St. Paul	64	69⅜
Chicago & Northwestern	108½	111
Chic., R. I. & Pacific	98¼	97½
Missouri, Kan. & Tex.	13¾	11½
Missouri Pacific	74¼	72
St. Louis & San Fran.	26	15¼
Pacific roads:		
Central Pacific	35⅜	33
Northern Pacific	25⅝	29¾
" pref.	60½	74½
Oregon Ry. & Nav'n	92¼	100½
Union Pacific	64⅜	68¼
Southern roads:		
East Ten., Va. & Ga.	9¼	9
" " 1st pref'd	65½	66
" " 2d "	23⅛	21
Louisville & Nashville	57⅜	85⅞
Nash., Chat. & St. L.	81⅞	102
Norfolk & West	16⅜	19⅛
" pref.	50¾	60
Rich. & W. P. Terminal	25¼	29¾
" " pref.	79	77¼

Four or five roads in this table show marked gains in value; one road, the Atchison, shows almost loss enough to offset them all. The other changes are comparatively small, some one way and some the other. The net result gives very little aggregate change either way. The bonds of the roads have increased somewhat in aggregate valuation, but the change is not very great. It is, to say the least, very curious that an increase of 12 per cent. in net earnings should have been accompanied by so little change in values. Four reasons may be suggested for this result.

1. The gain in net earnings is almost never quite so important as it looks. Increased earnings are apt to be based on increased mileage, and to be subject to increased fixed charges.

2. The gain is, in many instances, simply a return to normal conditions. Those of 1888 were abnormally bad, and regarded as such by the investing public, so that the value of some of the stocks was not correspondingly depressed. C., B. & Q. is an instance in point. It was higher at the beginning of 1889 than at the end.

3. The public is slow in finding out what is going on. The fall in the earnings of Atchison did not have its corresponding effect on Atchison securities until this state of things had become a matter of notoriety. This stock was much higher a year ago than it is to-day, although the real condition of things was much worse then than it is now.

4. The value of stocks, after all, depends upon a great many other causes besides their earning power. In the long run, of course, the latter must tell; but for the time being the market is made by people who do not look more than a few months ahead, and often not more than a few days. If investors were wise, the shortsightedness of some of these operators would furnish them the opportunity to make money by buying stocks for permanent instead of their temporary value; but the ordinary investor hardly has the knowledge necessary to take advantage of this state of things. Publicity of accounts, as far as it goes, is a help to him; but it will have to go a great deal further than it now does before we can establish any very direct connection between the reported earnings of railroads and the movements of investment demand in Wall street.

The Western Railway Club.

The Western Railway Club is now undergoing a marked change in development. The membership is being rapidly increased and a larger proportion of members attend the meetings, yet there seems to be no proportionate increase in the number of speakers; the same familiar names continue to appear. The speakers are generally about the same men whatever may be the subject, and there seems to be no reason why those members should be compelled to carry on the discussion of the topics. It is a difficult matter for the President of the club to get members upon their feet, and he is compelled to call upon those who have always shown a willingness to take part. From this it is not to be inferred that the silent members have no opinions of their own, because they have, and good strong ones, too. One need only listen to their conversation to learn that much valuable information is for some reason or other held in check.

A number of members, including not only railroad men, but manufacturers also (and this is a most desirable class of members to have present and to take part), state that the reason why there are not more speakers is because many do not feel justified in exposing themselves to the mercies of a reporter under a system of publication which does not give them an opportunity to reconstruct their sentences and omit undesirable expressions before extensive publication in the technical journals. There are but few speakers who would not desire to make changes in their remarks if they could see them in print before publication, and as this is the privilege of members of most organizations of a similar character in every country on the face of the earth, they do not see any reason why it should not be granted to them; and, further, they do not see why the club should not govern the method of publication, regardless of the wants, needs, or desires of the technical papers.

The object of such a club is to furnish an opportunity for the free and unbiased exchange of ideas, opinions and experiences among railroad men and the maker of railroad supplies. A meeting of the club should give an opportunity for a railroad man to make critical remarks regarding any particular manufactured article if he thinks best, and give him a chance to learn from the experiences of others whether or not his opinions are sound. It should also give the manufacturer of railroad supplies an opportunity to criticise to his heart's content the treatment he receives from railroad companies, and to discuss his wares freely when subjects in which he is interested are brought before the club. This desirable freedom of speech will not be had as long as unlimited powers are given to the technical journals to publish proceedings and discussions without giving each individual member a chance to revise his remarks, and to remove all that he does not

desire to see in print, but which he is ready and willing to say to the members of the club.

This is a very important subject, and the future of the club is somewhat dependent upon the treatment of it, and it is to be hoped that the March meeting will be well attended by members who have formed an individual and independent opinion on the subject, and who will express that opinion firmly and decisively in order that a conclusion satisfactory to the majority of the members may be reached.

January Accidents.

Our record of train accidents in January, given in this number, includes 76 collisions, 89 derailments and 6 other accidents; a total of 171 accidents, in which 67 persons were killed and 227 injured.

These accidents are classified as follows:

COLLISIONS:		
Rear	32	
Butting	24	
Crossing and miscellaneous	20	
		— 76
DERAILMENTS:		
Broken rail	7	
Loose or spread rail	3	
Broken bridge	2	
Defective switch	3	
Defective frog	1	
Broken wheel	3	
Broken axle	2	
Broken truck	6	
Broken brake-beam	1	
Misplaced switch	1	
Rail out for repairs	3	
Runaway train	2	
Open draw	2	
Bad switching	2	
Bad loading	1	
Cattle on track	4	
Snow and ice	2	
Landslide	3	
Accidental obstruction	4	
Malicious obstruction	3	
Purposely misplaced switch	3	
Sand drifted on track	2	
Unexplained	29	
		— 89
OTHER ACCIDENTS:		
Boiler explosions	5	
Car burned while running	1	
		— 6
Total number of accidents		171

The causes of collisions, where given, were as follows:

	Rear.	Butting.	Crossing and other.	Tot'l.
Trains breaking in two	1	..	..	1
Misplaced switch	3	3	1	7
Failure to give or observe signal	2	..	..	2
Mistake in giving or understanding orders	..	7	..	7
Miscellaneous	11	5	3	19
Unexplained	15	9	16	40
Total	32	24	20	76

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road	..	16	..	16	9
Defects of equipment	1	12	5	18	11
Negligence in operating	16	11	..	27	15
Unforeseen obstructions	1	21	..	22	13
Miscellaneous	18	..	..	18	11
Unexplained	40	29	1	70	41
Total	76	89	6	171	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Passenger	39	28	..	67	27
Freight and other.	113	61	7	181	73
Total	152	89	7	248	100

The casualties may be divided as follows:

	Collisions.	Derailments.	Other.	Total.
KILLED.				
Employés	25	26	1	52
Passengers	7	7	..	14
Others	..	1	..	1
Total	32	34	1	67
INJURED.				
Employés	61	54	8	123
Passengers	34	68	..	102
Others	2	..	..	2
Total	97	122	8	227

The casualties to passengers and employés, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	7	32	4	6
Defects of equipment	..	8	2	8
Negligence in operating	7	34	29	82
Unforeseen obstructions and malleiousness	..	16	10	14
Unexplained	..	12	7	13
Total	14	102	52	123

Thirty-nine accidents caused the death of one or more persons, and 41 caused injury but not death, leaving 91 (53 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with the same month in previous years shows:

	1890.	1889.	1888.	1887.
Rear collisions	32	22	36	32
Butting "	24	17	34	17
Crossing and other collisions	20	6	2	5
Derailments	89	72	151	73
Other accidents	6	7	16	13
Total "	171	124	239	140
Employés killed	52	25	43	26
Others "	15	10	24	20
Employés injured	123	75	107	72
Others "	104	38	116	65
Passenger trains involved	67	40	118	73
Average per day:				
Accidents	5.52	4.00	4.71	4.51
Killed	2.16	1.13	2.16	1.48
Injured	7.32	3.65	7.20	4.42
Average per accident:				
Killed	0.302	0.282	0 280	0.328
Injured	1.327	0.911	0.933	0.978

The number of passengers killed in January is larger than in any of the last three months and larger than the average for the past year, which was nine per month. As our readers know, six of the deaths are attributable to a derailment at Carmel, Ind., which, although set down as a "defect of road," seems to be clearly attributable to negligence, the defect which caused this derailment having been one which could readily have been corrected by ordinary care. Of the other passengers killed three were in the rear collision at Winton Place, O.; one in another rear collision at Omaha; one in the wreck of a bridge weakened by a freshet in Texas, and three were drovers, who were riding in a caboose. The first accounts printed of the Winton Place collision appear to have been correct, the block signal operator having been negligent. The discipline of operators appears not to have been very strict. At Omaha it may perhaps be said that the engineer of the freight was alert and sufficiently cautious, and that the fatal results are to be charged only to a "mistake of judgment." We will not deny this, but every one must agree that as a general rule the certainty of a collision between freight cars would be preferable to the possibility of one between an engine and a loaded passenger car; certainly this is so when the possibility is so near a probability as appears to have been the case in this instance. The disasters incident to snow-bucking are also of a kind which it is perhaps not fair to class under "negligence;" but aside from these, the collisions under 'miscellaneous" causes all come under the head of carelessness.

Two or three accidents to passenger trains were followed by fire, but the flames were quickly controlled. It is stated that the persons killed at Winton Place did not suffer from the flames. The overturning of a train by wind at Monument, Col , was one of these cases, and it must be regarded as extremely fortunate that the trainmen succeeded in extinguishing the flames. That wind-storm is said to have been the worst in Colorado for 25 years. A number of trains were derailed by the drifted sand, and the conductor of one of the trains derailed had to crawl on his hands and knees to the nearest telegraph station. A train was blown from the track of the Grand Trunk near St. Hilaire, Que., Jan. 13. This, we suppose, must have been a train of standard gauge cars, which we do not recollect to have heard of in such an accident for several years, except, perhaps, one or two cases of empty freight cars.

The two somewhat narrow escapes from bad drawbridge accidents were discussed in the *Railroad Gazette* of Jan. 24. The superintendent of the Long Island road got out indictments for the arrest of the engineer and fireman who came so near running their train into the open draw, but it appears that the case was not followed up in the courts. A switchman on the New York Central & Hudson River was arrested for throwing a passenger train upon a side track at New Hamburg, N. Y. The train was running rapidly but was stopped without damage. Not far from Palatine Bridge, Jan. 30, a carload of passengers in a standing train had a chance to experience the sensations caused by an impending collision. A freight train came so near repeating the Palatine affair that the passenger conductor drove the passengers out of the rear car.

The six-track railroad of the Illinois Central, at Chicago, was the scene of two collisions during a dense fog on the morning of the 30th. Both were comparatively harmless, but they vividly illustrated the many risks involved in working so large a system without the aid of block signals or distant signals of any kind. The paragraph containing the report of a rear collision at Unionport, O., on the 12th, really embraces two separate collisions; this is one less than the number given in the press reports published the next morning, but the report still is bad enough to throw some light on the causes which go to make the record of rear collisions so constant month after month. In the investigation of the rear collision at Owego, N. Y., on the 31st, one of the expert witnesses was of the opinion that a bright electric street light seriously impaired the runner's view of the tail lights of the train ahead of him. A curious occurrence among the reports of the month was the suffocation of 15 horses in a car on the Central of New Jersey, Jan. 10. A gravel train on the Pittsburgh & Lake Erie at Ballston, Pa., suffered severely from the explosion of the boiler belonging to a steam shovel, Jan. 15. In a late issue of the Atlanta *Constitution* appears a thrilling story related to its reporter by a locomotive runner, who, while running a freight train one night a few weeks ago, suddenly discovered that he had misconstrued his orders. He succeeded in stopping in time to flag a passenger train coming in the opposite direction.

Annual Report

Chicago & Alton.—Results of operations are as follows:

	1889.	1888.
Miles operated	849	849
Earnings—Passengers	$2,218,703	$2,221,005
" Freight	4,932,296	4,901,248
Total, including miscellaneous	$7,516,616	$7,511,465
Operating expenses	4,571,736	4,668,084
Net earnings	$2,944,880	$2,843,381

After payment of interest, rentals, and 8 per cent. dividend, this allowed an increase of $120,000 in the surplus of the company.

The decrease in operating expenses is a real and not an apparent one, as shown by the decided reduction in expenses of transportation and motive power. Maintenance of way has also decreased, but car maintenance has increased. Passenger rates have increased while passenger movement and passenger train loads have diminished. Freight rates and freight movement are at about the same figures (0.918 cents charged per ton-mile) as in the previous year. It seems likely that freight train loads were better this year than the last, but statistics on this point are meagre.

The president gives a long and able, but pessimistic, review of railroad legislation, and concludes by a detailed project for national railroad purchase and ownership.

Feb. 15 Mr. R. P. Flower, of New York, introduced in the House of Representatives a "bill regulating railway appliances," which was referred to the Committee on Railways and Canals. The bill will come before that committee next Monday. The bill is very crude, and evidently drawn without much care, and we conclude that it did not originate with the parties who have been prominent in advocating legislation on this subject during the past few months, and who secured the mention of the subject in President Harrison's message. Those men, though exceedingly zealous, were actuated by much caution and good judgment. The words of the bill are in part as follows:

All persons and corporations operating any line or lines of railway by steam power in any state or territory of the United States shall, after Nov. 1, 1892, equip all of their own engines and freight cars run and used in freight trains, or other trains, in any state or territory of the United States, with an automatic coupler, . . . and with automatic air brakes; and it shall be unlawful after that date to run or operate in any state or territory of the United States any freight cars belonging to such persons or corporation without having the same equipped with the appliances above mentioned. . . .

Any person or corporation operating a line of railway by steam in any state or territory who shall fail or neglect to comply with the provision of this act, shall be guilty of a misdemeanor, and, on conviction, shall be fined $500 for each offense: *Provided*, That the employés shall not be deemed guilty or subject to punishment under this act.

It will be observed that the law is not limited to equipment used in interstate commerce, but that *all* engines and freight cars in the United States must be fitted with these appliances, and that the work must be done in something less than three years. Setting aside all question of the constitutional limit of the powers of Congress, any one conversant with the facts will recognize that it is physically impossible to comply with the law within the time specified. It does not seem possible that the bill can have been introduced seriously.

As most railroad men know, and as everybody has seen from the sketches printed in the illustrated papers, the running of trains on the California railroads, even after the blockade is raised, cannot be an easy task. Operating a single track which, for long stretches, is in a cut 10 ft. wide, is beset with many difficulties at best, and when a little more snow falls the troubles accumulate rapidly. Such an experience has befallen the Southern Pacific people, as will be seen from the following report, sent east by General Manager Towne on Friday last:

"The last passenger train but one that went up the mountain on the Central Pacific required 19 of our most powerful locomotives and a push plow to get it over, and even with this power it got stalled near Emigrant Gap. This was the last trip possible to make with the push plow. After that they had to depend entirely upon power plows to throw the snow out of the deep cuts. The storm is not now as severe as last night, but if it continues 24 hours longer it will be impossible to keep the line open with any power. When I left the office to-night, there were 1,245 shovellers between Colfax and Truckee, and more on the way."

The next day the weather had cleared in the Sierras and trains were all in motion. Two westbound passenger trains that had been detained left Emigrant Gap Saturday morning. On Wednesday night, the 19th at Cape Point Mills, a plough engine and four other locomotives were derailed by a broken rail. The plough engine and two succeeding locomotives were carried down a bank 50 ft. The two rear engines were derailed. A brakeman was killed and three other men were injured.

The locomotive engineers of the Chicago, Rock Island & Pacific have been in conference with the officials for some time, seeking a readjustment of the scale of wages on the main line and the Chicago, Kansas & Nebraska. When the Rock Island proper was consolidated with the lines west of the Missouri River it was found that the wages paid on the western end were less than those paid on the main line, and the engineers appealed to General Manager St. John for an adjustment. They came to an amicable understanding, the terms of which are substantially that the scale on the western line shall be slightly raised and that on the main line slightly reduced. So far as the rates have been published it would seem that the men east of the Missouri have accepted a reduction of three or four per cent. in return for an advance of a similar amount in the rates paid their brethern west of the river, a fact which indicates the existence of a strong bond of sympathy in the brotherhood.

It is taken for granted that the action of the House of Representatives in voting last Monday that the World's Fair shall be held in Chicago settles the matter in favor of that city. Probably it does, but there are

still chances for a slip. The Senate has yet to act in the matter, and in the congressional legislation yet to come there may be surprises. The probability, however, is that the fair when it is held will be held in Chicago. It is hardly likely that it will be held so soon as 1892, but we may expect that an immediate impetus will be given to the elevated railroad projects in Chicago, and it is to be hoped that a speedy and permanent advantage will be gained in improvements in the arrangements of the surface roads for running into the city. Perhaps some of them will now see their way clear to begin the separation of grades.

The experience of the Chicago, Milwaukee & St. Paul with electric lighting of passenger cars has been favorable so far. It is found that increased patronage has been the result of the adoption of the new system; partly, no doubt, as a result of the convenient and elegant arrangement of the lamps. One additional passenger about pays the cost of lighting a train between Chicago and St. Paul, and the increased patronage more than pays for the additional cost of electric lighting over the oil lamps formerly used. This road has taken up this subject with a determination to develop it as much as the existing knowledge of the subject will permit, and to determine the actual cost and the real advantages or disadvantages to be obtained from the use of electricity.

NEW PUBLICATIONS.

Care of Cash by Agents and Conductors. By M. M. Kirkman, Chicago.

This is a hand-book of 175 pages, containing an elaborate discussion of the topic indicated by the title. The author handles the subject in his usual exhaustive manner, and gives very minute directions, so that the most inexperienced agent, even if he were just from the wilds of Africa, would have no possible excuse for wasting a tenth of a cent, or for annoying the local treasurer once a century. The forms of the different blanks needed for these departments of work, as shown in the appendix, are carefully prepared with a view to their use in Kirkman's multiplex system of accounts, which, as is doubtless well known, consists in arranging the printed matter on several blanks (as, for instance, freight received record, notice of arrival of goods, receipt to be signed by consignee, receipt to be given consignee for freight charges paid by him), so that the written portion can be inserted on all four at once by means of carbon sheets.

Hand Book of Freight Accounts.—This is a small book, similar to the above, and by the same author, containing voluminous rules for the guidance of local freight agents in all the departments of their clerical work. Fifty-one forms of blanks are shown, the uses of the multiplex system being lucidly explained in each case. As with the book mentioned in the preceding paragraph, there would seem to be no possible excuse for misunderstanding, even by the most obtuse mind, if the directions are carefully read. In fact, the chief criticism which a practical man would make in regard to these and others of Mr. Kirkman's books, would be, that they tell too much. To be told two or three times on the same page to do the same thing makes the average independent American slightly "tired." The "Hand Book of Freight Accounts" is a sort of condensation of matter which has appeared in former and larger volumes by the same author. Mr. Kirkman states that he has been at work on this subject since 1860 and he names a number of men who have given him some aid in the compilation of the rules.

Efficiency of the Link as Compared with other Valve Motions.

At the February meeting of the Western Railway Club the discussion of this subject was continued from the January meeting.

Mr. WALDO H. MARSHALL opened the continuation of the discussion on this subject by exhibiting and explaining blue prints of a device invented by Mr. Wilson, formerly Master Mechanic of the Chicago & Alton. He stated that there was no information given as to the quality of coal used by the different engines on which this device had been employed, and, consequently, an accurate comparison could not be made.

Mr. BARNES: I do not see that the comparison of the efficiencies of these gears amounts to very much, so far as the figures go, but those indicator cards look rather promising. I would like to know the comparative weight, number of parts and cost of this gear, and the cost of maintenance and the power which is used in driving it. We might stand more weight and an increased number of parts, provided it did not cost any more to maintain. This valve has been used a long time on the Chicago & Alton, and I think figures on the cost of repairs and maintenance should have been presented. Are there any sliding parts in this gear under pressure?

Mr. MARSHALL: The block that drives the exhaust gear slides probably six inches or more within a groove; and in the middle, the rod attached to the eccentric rod, there is also a sliding fulcrum, and at the other end of it there is a sliding block, so that there are three sliding points under pressure. I am not sure that I could present the claims that Mr. Wilson has made for his gear, but I should judge that one of the chief difficulties that he is trying to overcome is the compression at high speed, that is, the compression resulting from the use of the ordinary link; and he does that by having a fixed compression, and making that low enough just barely to take the inertia of the reciprocating parts at high speed. I do not think that he has operated a balance valve in connection with it. The drawing does not show a balance valve, and I am under the impression that he has not used it. I think his valves are considerably maller in area than the ordinary steam chest valve, although, of course, on the other hand, there are two of them.

Mr. PEOPLES then explained, in a clear and satisfactory manner, on the blackboard the character of the Wolf valve gear, a gear which, he said, was designed in such a shape as to be applied to any engine without interfering with its working parts. He stated that in one form or another it is applied to five engines and will soon be on two more. It has been applied in this form about a year and a half, and has been run without any change whatever. It is on an engine at Omaha, where it has been in use since last May, and they have tested it in a great variety of ways.

It is easier to construct than the ordinary link gear, and easier to maintain. It gives a quicker port opening and a more prolonged opening. It allows the steam to get in better and get out better, and it can certainly be adapted to a greater variety of engines than can the link motion, and modified to a greater extent to suit peculiar circumstances.

Mr. LEWIS: What is the back pressure as compared with the ordinary slide valves, and is there any claim for a decrease of compression as well as back pressure?

Mr. PEOPLES: In regard to the decrease of compression, that can arise, of course, only from delay in the movement of the valve at a certain point. That, I think, we have done to a very material extent. The cards here show that it appears to use less steam than the link motion.

Mr. BARNES: I have a rather interesting indicator card here, taken from a Lehigh Valley engine. It almost exactly resembles that taken from an engine with a Corliss valve gear, run at 120 revolutions per minute. This gear is what is known as an independent cut-off gear. On each side of the engine there is the ordinary slide valve, with a plain cut-off valve on top of it, driven independently. Such a gear will produce a card such as I here show, and it is the only card I have ever seen from a locomotive, driven at 55 miles an hour, with a satisfactory amount of compression, which is here, as you see, very small indeed. In addition to that, I have some indicator cards, just received from England, showing the action of a compound locomotive of the Worsdell type, running as high as 86 miles an hour. Probably this card, taken at this high speed, is the only one in existence. Mr. Worsdell is enabled to get a card of this kind at such a speed only by placing the gear, which is a Joy motion, at a long cut-off. If he cuts off early with the Joy gear, as with all the other gears presented here to-day, he gets a compression higher than the boiler pressure.

Regarding the Lehigh Valley gear, the compression and the exhaust opening are wholly governed by the main valve, which can be driven independently in any manner desired, and the cut-off is also independent, and governed by the cut-off valve on top of the main valve.

Mr. PEOPLES: The clearance is something that should be considered in looking at the compression, as shown in those cards.

Mr. MARSHALL: That, I think, is an important point—the amount of clearance in each of these compression lines. At the same time, if the Lehigh Valley engines have two valves and are driven independently, I should not be surprised if the additional complications would counterbalance the additional advantages obtained. The distance between the cylinder head and piston head is not always a good thing to judge by in the matter of clearance.

Mr. BARNES: That is, the clearance should be reckoned in per cent.

TECHNICAL.

Locomotive Building.

The Cooke Locomotive Works have an order from the Union Pacific for 15 consolidation locomotives, weighing 86 tons each, with eight drivers and 20 × 26 cylinders.

The International & Great Northern has contracted for 10 mogul freight engines and six heavy passenger engines.

Car Notes.

The Chicago, Milwaukee & St. Paul is building 100 refrigerator cars, with the national hollow brake beam and the Westinghouse air brake.

The Cleveland, Cincinnati, Chicago & St. Louis has let a contract for 1,000 cars to the Barney & Smith Co., of Dayton, O., and for 1,000 to the Missouri Car & Foundry Co., of St. Louis.

The Chattanooga Car & Foundry Co. is completing some platform cars for the Huntsville & Monte Sano, ten drop-bottom cars for the Chattanooga Union and eight platform cars for the Ensley furnace at Sheffield, Ala.

The Pullman Car Co. has received an order for 12 cable cars for the Brooklyn bridge at $3,900 each.

Two new chair cars have been built at the Toledo shops of the Wabash.

The Pardee Car & Machine Works, of Watsontown, Pa., have been awarded the contract for constructing 100 60,000-lb. hopper gondola coal cars for the Westmoreland Coal Co.

The Muskegon Car Co., of Muskegon, Mich., is building 300 cars for the Elgin, Joliet & Eastern.

The Louisville & Nashville is daily receiving new coal and ore cars for its southern lines from the Ensign Car Works at Huntington, W. Va.

The International & Great Northern has placed an order this month for 800 box, six passenger, two baggage and two mail cars.

The Roanoke Machine Works have finished 20 new coal cars for the Norfolk & Western.

Bridge Notes.

The Missouri Valley Bridge & Iron Works of Leaven worth, Kan., has received the contract to build four iron bridges at Beeville, Tex.

The City of Roanoke, Va., has voted to issue $30,000 of bonds for overhead bridges on certain streets crossing railroad tracks.

Proposals are wanted until March 1, for the construction of an iron bridge at Couchville, Tenn., by Esquire Engeles, Nashville, Tenn.

The Commissioners' Court of Goliad County, Tex., has let the contract for raising the iron bridge over the Goliad River and putting in an additional span of 100 ft.

The County Commissioners have let the contract for an iron bridge 250 ft. long near Florence, Ala., to N. H. Converse, of Chattanooga, for $4,078. There were 16 bids for the work.

Plans have been prepared for a bridge over the Mississippi River at Hastings, Minn. The bridge is to be 400 ft. long and 50 ft. above high water mark.

L. E. Vogler, of the Bothwell Bridge Co., will receive proposals until March 5 for the erection of an iron bridge over the Thames River at Bothwell, Ont.

A bill has been introduced in the United States Senate to authorize the Lake Superior & Pacific to build a draw bridge, with 110 ft. spans, over the St. Louis River, between Minnesota and Wisconsin.

The President has approved the act for the construction of a bridge across the Mississippi River, at or near Burlington, Ia., and the act for the construction of a bridge over the Missouri River, in Douglass County, Mo., or in Sarpy County, Neb.

The County Commissioners propose to build a bridge across the Brazos River, in Waller County, Tex.

The bill authorizing the construction of a bridge across the Mississippi River at Lyons, Ia., is now before Congress. The bridge will be 1,600 ft. long and 58 ft. above high water mark. The estimated cost of the structure is $100,000, and $30,000 of this amount has been subscribed by the city of Lyons.

The bid of the Edge Moor Bridge Works, of Edge Moor, Del., to construct the Selby avenue bridge, at St. Paul, Minn., for $69,071, has been formally accepted by the Board of Public Works.

The following bids for erecting a bridge over the Ten Mile River, were received by the State Engineer, at Denver, Colo.: Missouri Valley Bridge and Iron Co., Leavenworth, Kan., complete, $1,585; Ernest Campbell, Breckenridge, Colo., $1,490.

A charter has been granted to the Shiffler Bridge Co., of Pittsburgh. J. W. Walker, who has heretofore been sole proprietor of the Shiffler Bridge Works, will be President of the new company; F. L. Geist, Vice-President, and C. D. Marshall, Secretary. The change will not take effect until April 1.

The Fort Worth & Denver City is to erect a steel bridge over the Trinity River at Fort Worth, Tex.

A new bridge will be erected over the Willamette River at Salem, Ore., to replace one destroyed by the recent floods.

Nine bridge companies submitted bids for constructing two iron bridges at Sauk Center, Minn. The bids of the Wisconsin Bridge & Iron Co., $6,089 and $3,481, were the lowest for the two bridges, and the lowest for the second. A. Y. Bayne & Co., of Minneapolis, made a bid of $5,974 for the first bridge.

A favorable committee report has been made to the New York State Legislature on the bill authorizing the New Jersey & New York Bridge Co. to build a bridge over the North River. The bill provides that the bridge shall be constructed at an elevation of at least 145 ft. in the clear above the level of mean high water at the towers or piers, and 155 ft. above the same level at the centre of the main span, and that no pier or tower or other obstruction shall be built in the river between such shore piers.

Bills have been introduced in the Ohio Legislature authorizing the Commissioners of Muskingum County to build a bridge over the Muskingum River, and authorizing Jackson County to borrow money to replace bridges washed away.

Bids will be received until March 7 by S. Phillips, Chairman of the County Committee, Eagle Furnace, Roane County, Tenn., for a bridge across White's Creek on the Cincinnati Southern.

The Commissioners of Kent and Catlin, of Queen Anne's County, Md., have decided to build a new bridge across the river at Crumpton. A draw was built in 1888, and now it is the intention to build the two ends of the bridge new. The contract has been awarded to R. N. Boston, of Chestertown, Md.

Manufacturing and Business.

J. J. McCabe, of 121 Liberty street, New York City, has leased the entire building No. 68 Courtland street, and will soon remove his stock of iron-working machinery for locomotive and machine shops to that building.

The Hinson Car Coupler Co. has established a branch office at Room 65, Boreel Building, No. 115 Broadway, New York. Mr. John M. Hoon will be in charge of this Eastern office and Mr. T. F. DeGarms will be associated with him.

The Simonds Rolling Machine Co., of Fitchburg, Mass., is making extensive alterations and enlarging its works. The company has an order for 40,000 track-bolts for the Old Colony, and a large quantity of small material for the Boston & Albany. It also has a contract for a large number of shells for the Driggs Ordnance Co.

Anthony & McElroy, of Philadelphia, have recently received an order from the Roanoke Machine Works for 1,200 Brazil turn buckles. Orders for smaller quantities, aggregating 300 turn buckles, have also been recently received from various firms.

The Gilbert & Barker Manufacturing Co., of Springfield, Mass., has been appointed general agent for the manufacture and sale of the fuel oil burners of the Aerated Fuel Co., of Springfield, for the entire United States.

A corporation in Tokio, Japan, "The Takata Company," has awarded a large contract for electric lighting to the Westinghouse Electric Co., of Pittsburgh, Pa. The plant will be put up at Shidznoka, near Tokio, and it will have a total capacity of 500 lights. This is the first alternating current central station plant in progress of erection in Japan. The Westinghouse Company will immediately make the first shipment of three 500-light alternating current dynamos, with other electrical appliances for a central station. A large central station for electric lighting is now being installed with Westinghouse alternating current apparatus in Canton, China.

The Ætna Machine Co., of Warren County, Ohio., has orders from Westerman & Co., of Lockport, N. Y., for a 550 H. P. engine to drive a train of rolls in the Lockport Mills, and from the Lancaster Iron Co., Lancaster, Ohio, for a 550 H. P. engine to drive a train of rolls in the mills at Lancaster.

The Scarritt Furniture Co., of St. Louis, has received an order for 200 Scarritt-Forney seats for new cars on the International & Great Northern.

Iron and Steel.

The Pottstown Steel Works, of Pottstown, Pa., is to put in a 10-ton Aikin hydraulic crane with three motions, built by the Lewis Foundry & Machine Co., of Pittsburgh. The latter company has shipped the Pennsylvania Bolt & Nut Co., of Lebanon, Pa., an 8-in. guide roll train, and a 16-in. merchant bar mill, together with

a full equipment of rolls and Corliss engines to drive the trains.

The new rolling mills of the Pennsylvania Bolt & Nut Co., at Lebanon, Pa., are nearing completion. They comprise three trains, 16 in., 10 in. and 8 in., and five heating furnaces, with a daily capacity of 100 tons. This firm has purchased all the machinery of the Iron City Mfg. Co., of Pittsburgh, and this will greatly increase its output of bolts and nuts for bridge work.

At the annual meeting of the Leechburg Foundry & Machine Co., W. D. Rowan, G. Mesta, W. A. Cochran, W. J. Steele and J. W. Poffenberger were elected directors. It was voted to increase the capital stock from $75,000 to $100,000.

The crucible steel works of Martin Joyce, at Coraopolis, about ten miles below Pittsburgh, will soon commence operations.

The new Bessemer steel department of the Oliver Iron & Steel Co., Pittsburgh, will be ready for operation shortly. The work of placing the two five-ton converters and the new blooming roll train in position, is now being done.

The Philadelphia Steel Co. has purchased a large tract of land at the new town of Charleroi, Pa., on the Monongahela River, and it is said will spend $250,000 on its new plant.

William Tod & Co., of Youngstown, O., have orders for an additional blowing engine for the Steubenville furnace of the Riverside Iron & Steel Co., and for large amounts of special machinery for Carnegie, Phipps & Co. and the Johnston Co., of Johnstown, Pa.

The Dunbar Rolling Mill Co. has been organized at Dunbar, Pa., to build works near that town. Seventy-five thousand dollars of the capital stock has been subscribed. C. B. Newman is President.

The Anchor Foundry & Machine Works, of Pittsburgh, is putting in its erecting department a 20-ton overhead traveling crane built by the Phœnix Iron Works Co., of Cleveland, O. The firm has contracts for a 24 × 30 engine for the new butt-weld department of the National Tube Works Co. at McKeesport, Pa.; a new rail-tipping machine for the Edgar Thomson Steel Works at Braddock, Pa., and a pushing machine for the pipe mill of Spang, Chalfant & Co. at Etna, Pa.

Steel Car Building in Chicago.

Our readers will have noticed in the daily press various accounts of a new industry to be started in Chicago, viz., the manufacture of steel cars. The project has now become a settled fact. The company has been organized, and a controlling interest is owned by Mr. T. W. Harvey, a well-known lumber merchant in the West. The works will be built immediately, at the crossing of the Grand Trunk and the Illinois Central systems in Chicago. The ground for the plant consists of 709 acres, and lies two miles beyond the city limits and three miles beyond Pullman. The size of the shops will be about as follows: Erecting and paint shops, two buildings, with 150 ft. covered space between, 80 × 300 ft. each; foundry, 100 × 100 ft.; machine shop, two stories, 100 × 120 ft.; blacksmith shop, 80 × 120 ft.; shop for the construction of iron sills, 40 × 150 ft.; wood shop, two stories, 60 × 150 ft.

A complete system of tracks and switches will enable cars to be run into any shop when desired, and rails will be laid for the transportation of material in any desired direction. Overhead cranes will be used to a large extent, and be driven in the most approved manner. The capacity of the shop will be 15 cars per day. The company has already a good demand for steel mail cars, and state that it also has an order for a steel chair car and a steel freight car from the Burlington road. The mail cars, as well as the other cars, are made fire-proof, and it is the intention to furnish in the mail cars a fire and burglar proof safe of large dimensions which can be locked securely in New York City, and carried without opening to the Pacific Coast with no danger of loss by thieves or fire. It is the intention to use the most improved machinery in this plant and to light the whole by electricity. The name of the place where the shops are located is Harvey, which already has a large wind-mill manufactory and a brass and iron foundry. In addition to the new steel works at this point, two large manufactories are to locate here, which are each now doing a good business in Iowa. The intention of the company is to make an attempt to build a steel freight car that will meet the demand of actual service, both in durability and cost. Of course, it is hoped that the first cars will be satisfactory, but even if they are not, it is the intention to keep on and develop one that will be, if money and energy can do so; and, further, to develop not only a business for the construction of, but also a demand for a better class of freight cars, constructed wholly of metal, if possible. A postal car, built on the system of this company, was illustrated in the *Railroad Gazette* Jan. 4, 1889.

The Westinghouse Buffer.

At New Durham, on the tracks of the West Shore on Tuesday last, an exhibition was made of the new Westinghouse double acting friction buffer as applied to freight cars, in connection with the Janney coupler and the Westinghouse brake. This train has been making a tour of the Western and Middle states as previously mentioned in the *Railroad Gazette*. The first exhibition was made at Altoona, Pa., the second at Chicago; after that at Cleveland, Buffalo and Coeymans Junction, near Albany, on the West Shore. At the Altoona and Chicago exhibitions the cars were not loaded, but since then they have been loaded with grain for the East, and at the New Durham tests carried 12½ tons each. The buffer has stood up well under the repeated blows, which in some cases have been so heavy as to cant the end sills of the car downward as a result of the flange on the draw-head striking it after the capacity of the friction buffer was exhausted. The construction of this device was shown fully for the first time in its new shape in the *Railroad Gazette* of Feb. 21. Its purpose is to serve as an absorbent of blows without permitting a reaction; the work being dissipated by the friction of the plates As this device has been exciting much interest because of its novelty and of the large experience of its makers in the railroad field, the exhibitions of its action have been well attended by prominent railroad men.

The Leslie Brothers' Manufacturing Co.

A company incorporated under the laws of the state of New Jersey, with a paid up capital of $500,000, with headquarters at Paterson, N. J., principal stockholders —J. S. Leslie, E. Leslie and M. Sweetnam—has been recently organized for the purpose of entering upon a larger field than was contemplated at the time its predecessor, the Rotary Steam Snow Shovel Manufacturing Co., was formed. The object the old company had in view was the manufacture of the rotary steam snow shovel only. The new company will not only build the rotary plows, but will also manufacture railroad appliances and different kinds of machinery of special merit, upon which the Leslies own valuable patents. With such a record as has been made by their rotary plow, the success of the Leslie Brothers can already be considered assured, and if their other devices prove as meritorious as "The Rotary," there is a fine future for the new company. The officers of the new company are J. S. Leslie, President and General Manager; E. Leslie, Vice-President; M. Sweetnam, Secretary and Treasurer.

New Shops of the Egan Company.

The Egan Company is making extensive additions to its shops in Cincinnati. The new buildings will cover a square in the heart of the business portion of the city, and will have a frontage of 360 ft., with a depth of 1,000 ft., all of brick, and four stories high, giving employment to nearly 400 workmen, and 150 in the foundry located near by. The capacity wi l be doubled. This increased floor space affords ample room for the building of the large tools required by car builders, railroad shops, etc., for which, of late, there has been such a good demand. The equipment of this establishment will be of the most modern type. The planer room has in it what is claimed to be the largest iron planing machine in the West, 72 in. wide, 20-ft. bed. The power to drive the machinery will come from a 300 horse power Corliss engine, and the works will be lighted by electricity.

The St. Clair Tunnel.

The tunnel is now completed for a length of 1,365 ft. on the American side. From the point where the old shaft was put down two years ago a change will be made in the method of removing the earth. This shaft, which was sunk to a depth of 100 ft., will be used for hoisting the earth to the surface. New buildings for the engine and boiler are being erected near the shaft.

To Improve Duluth Harbor.

The Secretary of War has transmitted to the House a report upon the survey of the property recently given to the United States by the city of Duluth, Minn. The project for improvement of the entrance to the harbor contemplates, first, the acquisition of the necessary land for the work, and quieting title to property already deeded to the United States, at an estimated cost of $100,000; secondly, the construction of new piers at the canal, and dredging the canal to a depth of 22 feet, $376,510; and, thirdly, the construction of a breakwater in front of the canal at an estimated cost of $1,869,332—total, $2,345,842.

Electric Street Railroads.

The Minneapolis & St. Paul Street Railway Company has decided to use electricity as a motive power. It will adopt the Sprague system, and contracts have been entered into for equipping 200 miles of track. The contract calls for 400 motors, two on each car, one on each axle. This will be the greatest length of track ever equipped by one company to operate by electricity. The contract amounts to about $2,000,000. An unused cable plant on which $400,000 had been spent was given up when it was decided to use electricity.

The Strong Locomotive.

The Strong Locomotive & Mfg. Co. has been incorporated in Ohio by James H. Stewart, M. D. Woodford, J. F. Barnard, Eugene Zimmerman, Matthew Addy, Alex. Gordon, of Hamilton; George S. Strong, Charles H. Duhme, Louis Duhme, James M. Glenn and C. Neilson.

Continuous Steam Heating on the Pennsylvania.

A passenger train fitted up with the return system with which the Pennsylvania has been experimenting for the past year at Altoona, and which has been heretofore described in the *Railroad Gazette*, has just been placed for trial on the Schuylkill Valley branch. Similar trains are being placed on all the divisions, says a Philadelphia paper, and it is believed that the tests have been satisfactory. These have been conducted by means of a train kept standing on a siding at Altoona, and have been successful in keeping a uniform temperature in all the cars.

Automatic Block Signals on the New York Central.

The Union Switch & Signal Company is to equip the Harlem division of the New York Central & Hudson River, from Mott Haven to Woodlawn, with the automatic electro-pneumatic block signal. This section has four main tracks, is about seven miles long, and there will be 13 blocks. There will be five pneumatic interlocking towers, including one at the north and one at the south end of the Y at the junction of the Hudson River division. The engine for compressing the air will be located at the Mott Haven yard.

The Laboratories of Cornell University.

In a recent circular sent out by Prof. E. A. Fuertes it is said that this college [College of Civil Engineering, Cornell University] will be glad to make experiments, or tests, or reports upon any subject within its power, free of charge in so far as the time, the personal service of its instructors or employés, or the use of its laboratories or equipment is concerned. If any expenses are incurred in the purchase of material, or for any other reason, cost charges may be made; but in any case, any probable or possible expense may be previously ascertained by correspondence. This college has in operation 10 laboratories dedicated to research or investigation in well-defined engineering specialties. Special attention is paid to this work: 1st is a "general laboratory" for all known tests of the efficiency of machines and of the materials of construction in wood, metal, or stone, including the usual range of tests, and the quantities or data that may be computed from the results of the tests. 2d: A laboratory is in operation for special investigations relating to "Bridge Work," and in which several important questions are now under treatment. 3d: There are four connected laboratories for comparisons of lengths, and such researches as are related to the determination of errors of graduations, or in micrometric, gravimetric, or magnetic investigations of the degree of precision required in geodetic, physical, and astronomical work. 4th: An "Hydraulic Laboratory," suited to the determination of all hydraulic coefficients or constants in a scale commensurate with the requirements of actual practice in a very large number of cases; and generously equipped for the determination of the efficiency of motors, and supplemented by the equipment of other laboratories. 5th: A cement and masonry laboratory provided with many automatic machines for various purposes, and carrying out its work on a large scale, with every advantage for systematic and standardized tests. The nature of the standards chosen so far have been the result of much study and not a little experience on the part of specialists. 6th: A bactereological laboratory for the investigation of bacterial life under its sanitary aspects, with the aid of medical and biological experts. This laboratory is gaining in importance quite rapidly, and will soon be completely equipped for the most advanced kind of work. 7th: A photographic laboratory, which is heavily called upon by the demands of the other nine laboratories of this college, and by the requirements of the class-rooms and field work. But this laboratory is run as an adjunct to the others, and is not intended to develop the progress of photography. 8th: A machine shop, with heavy and with delicate machinery is also connected with the laboratories for the repair of the equipment, with two mechanicians constantly preparing specimens for tests, or constructing special apparatus. In addition to the facilities mentioned, the college has access to the chemical, botanical, electrical, entomological, geological, physical and mechanical laboratories in other colleges or departments of the University, and to their libraries and equipment, with the co-operation and advice of the specialists in charge.

Prof. Fuertes adds: "It gives me much pleasure to add that this college will be glad to do any work of the nature indicated, and that I shall be willing, at any time, to answer such questions as you might wish to ask in reference to our capacity for performing any tests, and their cost to you, with the understanding that no charges will in any event be made for time or professional services, use of equipment, machinery or profits, as previously stated."

THE SCRAP HEAP.

Notes.

Right Rev. John Shanley, Roman Catholic Bishop of North Dakota, is having a car built in which to make his episcopal visitations.

The Columbus, Hocking Valley & Toledo road has appointed an oculist, who is now examining the train and station men for defects of vision.

The Central of Georgia will, it is stated, erect new shops in Columbus, Ga., at a cost of about $100,000, at an early day. The City Council has been asked to donate the ground to build the shops on.

During January last the Michigan Central made the remarkable record of running an average of 41 trains per day over the Canadian Division, which is a single-track road. Over 50 trains passed a given point on some days, but the reduction of work on Sundays cut down the daily average.

A Buffalo paper says: "The New York Central has abandoned the experiment of having one conductor make the through trip between New York and Buffalo on trains 8 and 9. It was found to be too much work for one man." These are the Atlantic and the Pacific expresses, and are scheduled at 14¾ and 15 hours respectively.

The annual contracts for coal to be delivered to the Grand Trunk, the letting of which is supposed to have a marked influence on the price at Buffalo for a whole season, have just been awarded. The price was on the basis of $1.80 per ton, delivered at the International bridge, Buffalo. Bell, Lewis & Yates, of Buffalo, took orders for 150,000 tons; Bright, Dowdell & Co., 50,000 tons, and Thomas Loomis & Co., 30,000 tons. Thomas Mitchell & Sons, of Brady's Bend, got 40,000 tons, and it is understood that the larger part of the rest of the 800,000 tons went to the New York, Lake Erie & Western.

A Pan-American Railroad.

The Committee on Railroads of the International American Conference has made a report which has been unanimously adopted by the Conference. The committee recommends the construction of an inter-continental railroad, to connect the railroad system of North America with that of the Argentine Republic. They propose an international commission of Engineers, who shall have their headquarters in Washington, and from this point shall direct a topographical, geographical and mineralogical survey of the route down the backbone of the hemisphere from the City of Mexico to the northern boundaries of the Argentine Republic. The commission is to be composed of representatives of each of the countries interested, and all its expenses are to be paid by assessment made upon them at a rate of $1,000 per million of population or some corresponding amount. Such an assessment would amount to a total of $150,000, which, it is thought, will be sufficient to meet all necessary expenses. The plan is for the engineers from the several republics to meet in Washington, and here divide the territory to be surveyed into districts as may seem most practicable. Both the President and Mr. Blaine are said to be deeply interested in this project.

Bridge Disasters.

A passenger train of the Evansville & Terre Haute was precipitated into Kelso Creek, near Vincennes, Ind., early on Tuesday morning. The engine was submerged and the engineer and fireman killed. The first three cars were badly wrecked, some of them being thrown completely across the stream, but only five passengers are reported as seriously hurt. It was raining hard and the river was high, but the cause of the failure of the bridge is not stated. Damage by heavy rains was reported from many points in Indiana. The Evansville & Terra Haute bridge, over the Eel River, was weakened, and the Pan Handle bridge, over Mad River, near Columbus, O., was washed out. Washouts were numerous, and a freight train of the Ohio, Indiana & Western was wrecked in one of them. Near Jackson, two bridges on the Ohio Southern Road were washed out and many culverts were destroyed. At Lima, the Cincinnati, Hamilton & Dayton lost a bridge.

Suits Against the Grand Trunk.

The victims of the train accident on the Grand Trunk at St. George, near Hamilton, Feb. 27, 1889, have consolidated their suits for damages against the company; the aggregate amount is $300,000.

The Baltimore & Ohio Relief Association.

The court at Baltimore has decided the cases of Cannon and Conley against the Baltimore & Ohio Employés' Relief Association and the Baltimore & Ohio Railroad. These cases were instituted some time ago by Cannon and Conley, praying for the appointment of a receiver and to set aside an assignment of the property and assets of the Relief Association made to the railroad company shortly before the dissolution of the relief association under the act of 1888.

The court decides that the repealing statute is constitutional and that a receiver should be appointed.

The agreement was made by the Committee of Management without notice to the members of the association. The court says that the very term members in this

connection conveyed certain recognized rights to those so termed. It is understood the railroad company will appeal to the Court of Appeals.

Standard Time Accepted in Cincinnati.

The city of Cincinnati adopted standard time on Feb. 22. Heretofore all business, except that of railroads and telegraphs, was done by local time, which is 22 minutes faster than central standard time, and churches, schools, stores and factories are all adapting themselves to the standard. Some of the churches changed the hour of morning service from 11 to 10.30. The banks have agreed to continue the same hours—from 10 to 3—thus setting the day's work back 22 minutes.

A New Equipment Co.

A bill has been introduced in the Virginia Legislature to Incorporate the Richmond Equipment & Security Co. The incorporators are William H. Palmer, William R. Trigg, J. J. Montague, R. A. Lancaster, T. William Pemberton, Thomas Atkinson and Norman V. Randolph. The company is to supply rolling stock to railroads and guarantee the equipment bonds issued by them. It is stated that the Richmond Locomotive and Machine Works will hereafter be known under this name.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Delaware & Hudson Canal, 1¾ per cent., payable March 15.

Fort Wayne & Jackson, 2¾ per cent. on the preferred stock, payable March 1.

Milwaukee & Lake Winnipeg, 4½ per cent., payable Feb. 1.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Adirondack, special, 21 Cortlandt street, New York City, March 14, to act upon a proposed issue of bonds.

Atlanta & Charlotte Air Line, annual, 48 Wall street, New York City, March 12.

Central Union Depot & Railway Co., special, Central Union Station Building, Third street and Central avenue, Cincinnati, O., March 10.

Colorado Central, special, Union Depot, Denver, Colo., March 17, to act upon a proposed consolidation.

Denver, Marshall & Boulder, special, Union Depot, Denver, Colo., March 17, to act upon a proposed consolidation.

Dunderberg Spiral, special, 831 Broadway, New York City, March 8 to act upon a proposed issue of bonds.

East Tennessee, Virginia & Georgia, special, Knoxville, Tenn., April 15.

Georgetown, Breckenridge & Leadville, special, Union Depot, Denver, Colo., March 17, to act upon a proposed consolidation.

Greeley, Salt Lake & Pacific, special, Union Depot, Denver, Colo., March 17, to act upon a proposed consolidation.

Illinois Central, annual, Chicago, Ill., March 12.

Kansas City, St. Louis & Chicago, annual, 511 Olive street, St. Louis, Mo., March 11.

Louisville, New Albany & Chicago, annual, 31 Nassau street, New York City, March 12.

Missouri Pacific, annual, St. Louis, Mo., March 11.

New Orleans & Northeastern, annual, New Orleans, La., March 3.

New York, Danbury & Boston, special, 96 Broadway, New York City, March 17.

St. Louis, Iron Mountain & Southern, annual, St. Louis, Mo., March 11.

Texas & Pacific, annual, 195 Broadway, New York City, March 5.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Association of General Passenger and Ticket Agents* will hold its next annual convention in the City of Mexico, Mex., March 8.

The *Master Car Builders' Association* will hold its next annual convention at Old Point Comfort, Va., June 10. Rooms should be secured of Mr. F. N. Pike, manager, Hygeia Hotel, Fortress Monroe, Va.

The *New England Roadmasters' Association* will hold its eighth annual meeting at Boston, Mass., Aug. 20 and 21.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *Northwest Railroad Club* meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets n the Saturday following the second Wednesday of each month at 7:30 p. m. in the director's room of the St. Paul Union station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meeting on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at Boston, at 7:30 p. m., on the third Wednesday in each month. The next meeting will be held at the American House.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the Fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Engineering Association of the Southwest* holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Boston Society of Civil Engineers.

A regular meeting was held Feb. 19, 1890, at the American House, President FitzGerald in the chair. Forty-nine members and seven visitors present.

Messrs. Frederick W. Farnham, Willard M. Foster, Alfred E. Nichols and Fred. S. Pearson were elected to membership.

The President announced the death of Lincoln Cabot, a member of the society, which occurred at Honolulu, Sandwich Islands, Dec. 14, 1889. A committee, consisting of Messrs. Tinkham and Blodgett, was appointed to prepare a memoir.

Mr. William E. McClintock was elected a Vice-President and Prof. W. S. Chaplin a Director, for the terms expiring at the annual meeting in 1891.

Messrs. H. H. Carter and F. P. Spalding were appointed tellers to canvass the ballots for officers at the coming election.

Captain Eugene Griffin, General Manager Railroad Department Thomson-Houston Electric Co., read a paper on "The Transmission of Power by Electricity." The paper was discussed by Messrs. Blodgett, Pearson, Tilden and others.

Engineers' Club of St. Louis.

The 322d meeting was held Feb. 19, Vice-President Burnet in the chair; 32 members and eight visitors present. The following were elected to membership: Wm. E. Barns, Emerson McMillin and John H. Pope.

Prof. J. B. Johnson read Mr. Edward H. Connor's paper on the "Substructure of the Cairo Bridge." The paper was accompanied by drawings, showing the spans, piers and caissons; also by numerous tables, and the complete specifications of the bridge. The paper explained the work of construction in detail, and the difficulties met with in various parts of the work. The tables gave the results of numerous tests on cements, showing the effect of different proportions of salt, the effect of freezing, the effect of fine grinding, etc. The results were given for both Portland and Louisville cements. A general discussion followed, participated in by Messrs. Crosby, Kebby, Holman, Ockerson, Burnet and Ferguson. Mr. Barr, of the firm of Anderson & Barr, who were the contractors for the substructure of this bridge, was present and related some of his experiences.

Under general discussion, Mr. Willard Beahan was called upon for some information regarding the outlook for engineers in South America, he having recently returned from that country. He stated that the prospects for American engineers were excellent at the present time. Railroads are few, but a large number are in prospect. Municipal engineering was just being taken up. The prices secured and salaries paid were good. Most of the engineers now in that country were French, there being only a few from America and England.

Engineers' Society of Western Pennsylvania.

The Tenth Annual Meeting was held at Pittsburgh, Jan. 21, 1890, President Brashear in the chair, and 60 members and four visitors present.

The board presented the names of the following gentlemen, applicants for membership: John M. Goodwin, William Wnigham, H. Saunders Morris, L. B. Stillwell and F. S. Smith, who were balloted for and elected.

The Committee on Union of Societies in the occupancy of one building presented a printed report, which was distributed. A. E. Hunt offered the following resolution:

"That the report of the committee on the union of the various Societies be received, and Resolved, that this Society is ready to join with other Societies in occupying a common home, under suitable conditions, when offered by the Pittsburgh Academy of Science and Art," which was adopted.

A. E. Frost, Treasurer, presented a report for the year ending Jan. 21, 1890. The receipts were $1,727.74, and the expenditures $1,447.26

The report of S. M. Wickersham, Secretary, gave the present membership as 336.

The officers elected for 1890 are: President, W. L. Scaife; Vice-Presidents, Phineas Barnes, two years; A. E. Hunt, one year; Directors, R. N. Clark, two years; W. G. Wilkins, two years; William Metcalf, one year; M. J. Becker, one year; Secretary, S. M. Wickersham, one year; Treasurer, A. E. Frost, one year.

Montana Society of Civil Engineers.

The regular monthly meeting of the Montana Society of Civil Engineers was held Feb. 15 at the office of E. H. Becker, of the Montana Central. Messrs. O. C. Dallas, Frank D. Jones, James L. Buskett and Finlay McRae were elected members.

The following committees were designated as standing committees for the current year: Committee on Public Works, Committee on Affiliation with the American Society of Civil Engineers, Committee on Public Land Surveys, Committee on Library, Committee on Topics.

Mr. Sizer, of the committee appointed to confer with the Hon. Thomas H. Carter on the subject of the revision of the United States mining laws, made a report of progress. The committee was continued to make final report at the next meeting.

Northwestern Track and Bridge Association.

The second regular meeting was held Feb. 15. The discussion was continued of Mr. Kimball's paper on "Shimming," an abstract of which was given in the *Railroad Gazette*, Jan. 3.

Mr. John Copeland (C., St. P., M. & O.), read a paper on the "Care of Pile Bridges in Winter." Extracts follow:

Where trestle or pile bridges stand in water, either running or a pond, the ice should be kept cut and a space around the piers be kept open at all times during the freezing weather, so when the spring freshets raise the stream or pond that the ice will be detached from the pier and consequently prevent the structure from rising with the ice. It frequently occurs where this is neglected that the piles or trestles are raised from 6 to 8 in. out of line by the pressure of the water under the ice, in one night. Sometimes whole bents would be raised, at other times one end of the bent, while the other end kept its place. To adjust the bridge again it would become necessary to cut the piling or posts, as the case might be, to bring it back to surface, and then when the ice began to thaw, the piles or trestle would naturally seek their former bed. Then it would be necessary to shim the bent. The only way to guard against this is as stated before, keep the ice cut around the piers, and thus prevent the upheaval.

In some kinds of soil heaving cannot be prevented, then the only alternative is to shim, but let this be done between the stringer and the cap. In no case should shims be allowed to be placed between the rail and ties, for it gives the spikes such a short hold that their utility as a binder is destroyed.

It often happens in different varieties of soil through which a roadbed passes, that the track at each end of a bridge will heave more or less. In such cases it is desirable to bring the bridge back to surface with as little loss of time and labor as possible and give good results. To do this shim the ends between the cap and stringer if it is a short bridge; if a long bridge shim several of the bents on each end, leaving the centre. By this means the ends are brought to surface, leaving a slight depression in the centre, the grade so regulated being so gradual that the concussion in crossing is hardly felt on the train while passing over it. When bridges are being built or rebuilt the drift bolts holding the stringer to cap should not be driven home, but about one or one and one-half inches undriven. Then there is no trouble experienced in getting under it with a shackle or claw-bar to raise it to insert the shim. This also prevents the ugly fractures made in the stringer or cap by the effort to raise it when the drift bolt is driven home.

This kind of shimming should be done by the insertion of a piece of pine the full width of the bridge and of the proper thickness required to bring it to surface. This leaves no chance for it to work out as in cases where short pieces are put in. Very often this shimming can be done without disturbing the drift bolt from the top. That is by setting a couple of screw jacks under the main stringer and raising the top to proper surface and cutting out a recess for the drift bolt in the shim. The exact place to cut this can be found when the stringers are raised to proper surface. Then insert the shim and push it in unfil the edge is flush with the cap. This shim should be at all times the full width of the top of the cap so as to give all the bearing to the stringer.

Not least in keeping bridges in proper shape in winter is the necessity of keeping all bolts tight with nuts and washers. This prevents the shaking and jingling incident to loose bolts and also prevents the ties from bunching in case of derailment. Considerable discussion followed.

Western Railway Club.

The topics for discussion at the next meeting of the club are: "Interchange Rules at Chicago" and "Best Means of Balancing the Reciprocating Parts of Locomotives."

PERSONAL.

—Mr. John Hewitt, Master-Mechanic of the Detroit division of the Wabash, has resigned.

—Mr. Harry Ebert, Division Master Mechanic of the Galveston, Harrisburg & San Antonio, has resigned.

—Mr. Julian Kennedy, Chief Engineer of the Latrobe Steel Works, of Latrobe, Pa., has opened an office in the Hamilton Building, Pittsburgh, as Consulting and Contracting Engineer.

—Mr. John Heck, formerly well known in Western railroad circles, died in Lockport, Ill., Feb. 21, in his 91st year. He was one of the projectors of the Joliet & Chicago, now operated by the Chicago & Alton, and was for many years a Director of the company.

—Mr. J. H. Stewart, lately General Manager of the Cincinnati, Washington & Baltimore, was presented last week by his former employés with a silver service of 268 pieces and two services of Dresden china, one of 15 pieces and the other of 14 pieces. He was also given a handsome watch, with chain and charm.

—Mr. O. P. McCarthy, Assistant General Passenger Agent of the lines of the Baltimore & Ohio west of the Ohio River, has been appointed General Passenger Agent of the Baltimore & Ohio Southwestern, relieving Mr. C. K. Lord, who has held that position in addition to his duties as Vice-President of the Baltimore & Ohio.

—Mr. Robert I. Sloan has resigned his position as Chief Engineer of the Manhattan Elevated Railway, New York City, to take a similar position on the Chicago & South Side Rapid Transit Co. in Chicago. His associates in the Engineer's Department of the Elevated gave him a complimentary dinner at Morello's last Tuesday night, and he leaves this week to take up his duties in Chicago

—Mr. C. H. Dunham, President and General Manager of the Dunham Manufacturing Company and long very well known to railroad men, has sold out his stock interest in that company. He has been for some time in somewhat delicate health and contemplates a complete rest from business cares for the present. This is the immediate reason for his retirement from the Dunham Company.

Mr. Charles E. Halbert, Superintendent of the Guadalajara Division of the Mexican Central, died Feb. 9 of pneumonia, after a short illness. Mr. Halbert was appointed Superintendent of the Guadalajara Division soon after it was completed, and had previously been Train Master of the division. He began service with the Mexican Central as a passenger conductor. Mr. Halbert received a decoration from the state of Jalisco for his heroism and service during the Lake Chapala disaster a year or two ago.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Sante Fé.—C. F. Zimmerman has been appointed General Agent of this company, with headquarters at Denver, Colo., vice H. G. Krake, resigned.

Atlantic Coast Line.—J. H. Nurney having been transferred to the Norfolk & Carolina, T. J. Whitton has been appointed Roadmaster of the Eastern Division of the Wilmington, Columbia & Augusta and Florence roads, with headquarters at Florence, S. C. J. E. Kelley has been appointed Inspector of the Charleston & Columbia Di-

visions, to succeed T. J. Whitton, with headquarters at Sumter, S. C. C. H. Newman succeeds J. E. Kelley as Roadmaster of the Cheraw & Darlington and Cheraw & Salisbury roads, with headquarters at Florence, S. C. These appointments take effect March 1.

Auburn, Ligonier & Chicago.—The organization of the company was completed at Ligonier, Ind., Feb. 20, and the following officers were elected: J. L. Davis, Auburn, Ind., President; R. L. Stone, Albion, Vice-President; W. H. Dills, Auburn, Secretary; Jacob Strauss, Ligonier, Treasurer.

Augusta, Gibson & Sandersville.—At a meeting of the new board of directors in Augusta, Ga., Feb. 17, the appointment of Hamilton Wilkins as General Manager was confirmed. George Adam was re-elected Secretary and Treasurer, and Maj. William Garry was re-elected Attorney for the road.

Central of Georgia.—James W. Phillips has been appointed Train Master of the Main Stem Division, which includes the line from Atlanta to Savannah, including the Savannah, Griffin & North Alabama, Savannah & Western, Upson County and Milledgeville & Eatonton. The appointment was referred to on page 116 of the issue of Feb. 14, but the little given was incorrect.

Henry Yonge, recently Division Superintendent of the Mexican National, has been appointed agent of this company at Macon, Ga., vice J. A. Englerth, resigned.

Central Kentucky & Ohio River.—Among the incorporators of this Kentucky road are: W. L. Crabb, W. P. Thorne, J. S. Baskett, W. S. Pryor, Jacob Smith, Joseph W. McCann, W. F. Peak, Jas. Clark and S. Barnes, Jr.

Chesapeake & Ohio.—R. H. Myrick has been appointed Superintendent of the dining car service, with headquarters in Cincinnati. He will report to the General Passenger Agent.

Chicago & Akron Junction.—The incorporators of this Ohio road are J. B. Caven, J. T. Johnson, William Thornburg, M. R. Dickey and E. J. Estep, all officers of the Valley road.

Cincinnati, Lebanon & Northern.—Clay Rockwell has been appointed Auditor and General Passenger Agent, vice P. L. Dudley.

Cincinnati & Richmond.—The annual meeting of the stockholders was held in Cincinnati last week. The stockholders elected the following directors: T. D. Messler, J. N. McCullough, W. A. Goodman, E. F. Fuller, Ralph Peters, J. Dunbar and James McCrea, the latter succeeding the late William Thaw. The Board organized by electing Thomas D. Messler President; S. B. Liggett, Secretary, and John F. Davidson, Treasurer.

Delaware, Lackawanna & Western.—At the annual meeting of the company held in New York, Feb. 25, the following directors were elected: President, Samuel Sloan; Secretary, Fred. F. Chambers; Treasurer, Frederick H. Gibbons; Managers, John I. Blair, George Bliss, Percy R. Pyne, Wilson G. Hunt, Benjamin G. Clarke, Sidney Dillon, Russell Sage, Edgar S. Auchincloss, Andrew T. McClintock, William H. Appleton, W. W. Astor, Henry A. C. Taylor, Eugene Higgins, in place of his father, deceased; William Rockefeller, in place of Gardner R. Colby, deceased.

Elgin, Joilet & Eastern.—Howard W. Beecroft, formerly Car Accountant of the Missouri, Kansas & Texas, has been appointed Car Accountant of this road, with headquarters at Chicago.

Fremont, Elkhorn & Missouri Valley.—W. C. Crook has been appointed Roadmaster on the Elkhorn between Fremont and Lincoln, with headquarters in Fremont, Neb.

Illinois Central.—N. D. Wiggins has been appointed Assistant Division Superintendent of the Louisiana Division, with office at New Orleans. In addition to other duties, he will have special charge of the terminal work of the company at New Orleans.

John Dunn, formerly Assistant to General Manager, has been appointed Assistant to the President, with headquarters at Chicago.

Kearney, Hutchinson & Gulf.—The incorporators named in the Kansas charter are: A. B. Bolton, Kearney, Neb.; J. D. Robertson and J. C. Postlethwaite, Jewell City; S. C. Bowles, of Mankato; A. D. Moon, W. B. Houghton and A. G. Mead, of Beloit; James H. Smith, I. B. Ballard and John Stanley, of Lincoln Centre; Arthur Larkin, A. Rogers and John Streddin, of Ellsworth, and J. Hull, of Minden.

La Plata.—The first directors are: F. O. Blake, Melvin Edwards, J. P. Airy, F. K. Atkins and C. O. Atkins, of Denver and Durango.

Lehigh Coal & Navigation Co.—At the annual meeting of the stockholders of the company, in Philadelphia, Feb. 24, the following Board of Managers was re-elected: Joseph S. Harris, President; Francis C. Yarnall, Vice-President; Edward W. Clark, Francis R. Cope, Charles Parrish, James M. Wilcox, Edward Lewis, T. Charlton Henry, Samuel Dickson, Edward H. Leisenring, Abram S. Hewitt and Thomas McKean.

Louisville, Hardinsburg & Western.—The officers of this company are: President, Col. Lafayette Green, and Vice-President, John Dean, with office at 251 Fourth avenue, Louisville, Ky.; Chief Engineer, C. W. McCracken, office Hardinsburg, Ky. W. V. McCracken & Co., 42 Wall street, New York City, are the agents in that city.

Newport & Cincinnati Bridge Co.—The stockholders of the company held their annual meeting in Cincinnati last week and elected as directors Thomas D. Messler, A. S. Berry, C. H. Kilgour, W. A. Goodman, Ralph Peters, T. B. Youtsey and M. J. King. The directors organized by electing Thomas D. Messler, President; A. S. Berry, Vice-President; John E. Davidson, Treasurer; S. B. Liggett, Secretary, and Ralph Peters, Superintendent.

New York, Lackawanna & Western.—The following directors were elected at the annnal meeting this week: Samuel Sloan, John I. Blair, Percy R. Pyne, George Bliss, Russell Sage, Henry D. Polhemus, Eugene Higgins, Sidney Dillon, William F. Halstead, William R. Storrs, Frederick H. Gibbons, Edgar S. Auchincloss, M.T. Pyne.

New York, New Haven & Hartford.—O. M. Shepard has been appointed Superintendent of the New York Division, with headquarters at the Grand Central Station, New York City. The position of General Superintendent has been abolished.

New York, Pennsylvania & Ohio.—J. T. Wann has been elected Auditor with office in Cleveland, to succeed the late Thomas Warnock, who was also Secretary. Mr. Wann was formerly Secretary of the Cleveland, Columbus, Cincinnati & Indianapolis.

Norfolk & Carolina.—J. H. Nurney has been appointed Roadmaster of the road, with headquarters at Suffolk, Va., the appointment to take effect March 1.

Omaha, Garden City & Southwestern.—The company has been incorporated in Kansas by C. J. Jones, B. F. Stocks, Jesse Taylor, and James A. Patten, of Garden City, Kan.; C. E. Gallagher, of Dodge City; W. W. Flannagan, C. H. Harmon, Orson Adams, and W. W. Conkling, of New York City.

Pennsylvania Co.—Several changes and promotions were made by the directors this week. The organization of the company has been divided into the traffic and transportation departments. Both departments were formerly under one head. J. N. McCullough, First Vice-President, will be in charge of the traffic department, and will also have general supervision of the financial affairs of the company. James McCrea has been elected Second Vice-President and will have charge of the transportation, engineering and construction work. Joseph Wood has been appointed General Manager of all lines west of Pittsburgh, in place of James McCrea, promoted. E. B. Taylor has been appointed General Superintendent of Transportation of all lines west of Pittsburg, to succeed Joseph Wood, promoted. Charles Watt has been appointed General Superintendent of the Northwestern system, to succeed E. B. Taylor, promoted. These changes go into effect March 1.

Pennsylvania, Poughkeepsie & Boston.—Henry H. Kingston has been appointed General Manager vice J. C. Stanton, resigned. His office will be at 411 Walnut street, Philadelphia.

Peoria & Eastern.—The first board of directors is as follows: John Alfred Barnard, of Indianapolis; John A. Glover, of Urbana, O., and Edmund L. Stewart, of Danville, Ill.

Piedmont Southern.—The incorporators are: James Swann, H. W. McElwee, and John C. Calhoun, of New York; Proctor Lea, Williard Saulsbury, Jr., and J. W. Taylor, of Wilmington, Del.; and B. F. Johnson, and J. M. Ledbetter, of Anniston, Ala.

Pittsburgh, Cleveland & Toledo.—The annual meeting was held in Youngstown, Ohio, Feb. 19, resulting in the election of the following directors: C. H. Andrews and L. E. Cochran, of Youngstown; W. W. Peabody and Orland Smith, of Cincinnati; David Lee, of Zanesville; R. R. Devries, of Newark; J. H. Collins, of Columbus; Thomas M. King, of Baltimore. The directors elected Orland Smith President and J. B. Washington Secretary and Treasurer.

Pittsburgh & Virginia.—Capt. F. E. Montague has been appointed Chief Engineer.

Rochester & Glen Haven.—At the annual meeting of the road held in Rochester, N. Y., Feb. 18, the following board of directors was elected: F. S. Minges, John D. Lynn, Frank Ritter, James Palmer, Jr., E. W. Huntington, Edward Appel, John Rauber, F. P. Crouch, A. S. Treat, S. A. McKenney, Maurice Leyden, E W. Mourer and N. Braver, Rochester.

Salmon Bay Railway & Development Co.—The following are the officers of the company: President, D H. Gilman; Vice-President, John Leary; Secretary and Auditor, C. L. F. Kellogg; Chief Engineer, R. H. Thomson. The address of all is Seattle, Wash.

Savannah & Atlantic.—This is a reorganization of the Savannah & Tybee. The directors are Herman Myers, S. P. Hamilton, O. G. Purse, J. H. Estill, Henry Blun, J. C. Rowland, J. J. McDonough, W. Kehoe, B. O. Bowers and S. P. White.

Taylor's Falls & Lake Superior.—The annual meeting of the line, a branch of the St. Paul & Duluth, was held last week at Taylor's Falls. The election of officers resulted as follows: President, R. S. Hayes; Vice-President, W. H. Bliss; Secretary, George Seymour; Assistant Secretary and Treasurer, W. H. Coleman.

Texas & Pacific.—P. M. Hartly has been appointed Division Roadmaster of the New Orleans Division, from Marshall to New Orleans, including the Marshall Yard, with headquarters at Marshall, Tex., vice M. Summers appointed General Roadmaster.

B. E. Mosher has been appointed Division Roadmaster of the Eastern division with present headquarters at Longview Junction, Tex., vice Leroy Trice appointed Superintendent of Eastern Division.

Wellsville, Coudersport & Pine Creek.—At a recent meeting of the directors at Wellsville, N. Y., the following officers were elected: President, John McEwen; Vice-President, E. J. Farnum; Secretary, H. K. Opp; Treasurer, H. N. Lewis; Attorney, Col. Rufus Scott; Executive Committee, John McEwen, E. J. Farnum, H. K. Opp, H. N. Lewis, George H. Blackman, W. B. Coats and Charles Day.

OLD AND NEW ROADS.

Addison & Pennsylvania.—This road, extending from Addison to Galeton, Pa., 46 miles, is to be changed to standard gauge in the spring. Preparations for the work are now being made. It is stated that an extension of the line from Galeton southwest to Coudersport is under consideration.

Akron & Chicago Junction.—This company has been incorporated in Ohio by officers of the Valley Road which is now controlled by the Baltimore & Ohio. The line of the proposed road is to extend from Akron to Chicago Junction, to complete a new line, in the interest of the Baltimore & Ohio, between Pittsburg and Chicago. The road will be 68 miles long.

Allegany & Kinzua.—The state railroad commissioners, of New York, have approved of the application of the company to increase the capital stock from $80,000 to $390,000, and also the proposed consolidation with the Bradford & Corydon road.

Atlantic Coast.—A bill has been introduced in the Virginia Legislature authorizing the Alexandria & Fredericksburg, the Richmond, Fredericksburg & Potomac, the Richmond & Petersburg and the Petersburg road to consolidate under the name of the Atlantic Coast Line. Two of these roads are exempt from taxes, but the consolidation will vitiate the exemption.

Auburn, Ligonier & Chicago.—The company was organized at Ligonier, Ind., last week, to build a line about 125 miles long in Indiana. J. S. Davis is President.

Atchison, Topeka & Santa Fe.—The gross earnings, operating expenses (exclusive of taxes and rentals,) and net earnings of the road and its auxiliary lines, for the month of December, 1889, is as follows:

Name of road.	Gross earn.	Oper. exp.	Net earn.	Oper. mileage.
Atchison, Top. & S. Fe and Leased Lines, including Chicago Line: St. Joseph; Chicago, Kan. & West.: New Mexico & Arizona and Sonora roads	$2,009,393	$1,070,728	$938,665	4,934
St. Louis, K. C. & Colo	5,337	5,960	Dif. 623	61
Gulf, Colorado & S. Fe	463,634	348,220	115,414	1,058
Southern California	99,710	107,435	Dif. 7,725	476
Total	$2,578,074	$1,532,343	$1,045,731	6,529
Roads jointly owned with other companies: Atchison Co.'s one-half	110,711	107,003	3,708	582
Grand total	$2,688,785	$1,639,346	$1,049,439	7,112

The comparative statement for all lines is as follows:

	Gross earn.	Net earn.	Per mile. Gross earn.	Per mile. Net earn.	
December, 1889.	$2,688,785	$1,049,439	$378	$177	....
December, 1888.	2,532,333	818,069	356	115	....
Inc., Dec., 1889.	$156,453	$231,370	$22	$32	....

	Gross earn.	Oper. exp.	Net earn.
Atchison, Top. & S. F. and leased lines, including Chic. line, St. Jo., Chic., Kan. & W., N. M. & Ariz. and Sonora	$20,814,384	$13,762,398	$7,051,986
St. L., K. C. & Col	62,756	63.653	Def. 897
Gulf, Col. & S. F	4,113,423	3,299,013	814,409
So. California	1,696,175	1,478,345	217,830
Totals	$26,686 739	$18,603,411	$8,083,328
Roads jointly owned with other companies, Atchison one-half.	1,449,716	1,369,664	80,051
Grand total	$28,136,456	$19,973,075	$8,163,380

Comparative statement, all lines:

	Gross earn.	Net earn.	Mile.
Year 1889	$28,136,456	$8,163,380	7,112
Year 1888	26,467,356	6,269,796	6,752
Increase, year 1889	$1,669,100	$1,893,584	360

Boston & Maine.—This company and the Eastern Railroad have submitted a bill to the Railroad Committee of the Massachusetts Legislature for the purchase of the Eastern by the Boston & Maine. The bill authorizes the latter company to purchase the Eastern and the Portsmouth, Great Falls & Conway, the agreement to be ratified by a two-thirds vote of the common stockholders and a majority vote of the preferred stockholders of the Eastern Co. The Boston & Maine may increase its stock by an amount not exceeding the present stocks of the Eastern and the Portsmouth, Great Falls & Conway. It may dispose of such additional stock by exchange or as agreed to. To facilitate the purchase of the two companies, the Boston & Maine may purchase the stocks of the companies and pay for the same by sale by auction of any part of the additional capital. The Boston & Main may increase its stock over and above the aggregate of the present capitals of the three companies by $5,000,000. This new stock is to be issued from time to time to pay for additional property, equipment and improvement of the property.

Cairo & Kanawha.—The charter of this company has been issued in West Virginia. The proposed road will commence at Cairo, in Ritchie County, and extend to a point near the confluence of McFarland's Creek and the south fork of Hughes River, thence to the town of Grantsville, in Calhoun County. The capital stock is $75,000. The office is to be at Parkersburg, W. Va.

Central of Georgia.—It is stated that the Perry branch of the Southwestern Division, which now extends from Fort Valley to Perry, Ga., 12 miles, is to be extended southeast to a connection with the Savannah & Western.

Central Kentucky & Ohio River.—A bill to charter this company to build a road from Shelbyville to Newcastle, Ky., has been introduced in the Kentucky Legislature.

Charleston, Cincinnati & Chicago.—The road has been completed through Washington County, Tenn., and it is stated that it will be put in operation between Erwin, near the North Carolina state line, and Minneapolis, Va., on the Clinch Valley Division of the Norfolk & Western early in July.

Chattanooga, Gadsden & Birmingham.—Thomas D. Fister, of Chattanooga, Tenn., is reported to be the contractor for the section between Gadsden and Leeds, Ala., on the Georgia Pacific. P. S. Fitzgerald is Chief Engineer.

Chicago, Kansas & Nebraska.—H. P. Dillon, of Topeka, Kan., has been appointed Master in Chancery to take testimony in the matter of the application of the Metropolitan Trust Co., of New York, for the foreclosure of the mortgage of $25,000,000 against the property of this road, now pending in the United States Circuit Court. The testimony for the complainant is to be completed April 1, and that for the defendants by May 1, and the report of the Master in Chancery, covering the the complete evidence, is to be filed at the opening of the regular term of the United States Circuit Court in June.

Chicago, Milwaukee & St. Paul.—Concerning the report that the road will extend across the Missouri River from Chamberlain, S. D., into the Sioux Reservation, President Miller is quoted as saying that "surveyors are now running a line to protect the company's rights in that section, but the matter of building has not yet been decided upon." The Iowa & Dakota division of the road now extends to Chamberlain, S. D., on the Missouri River, opposite the Sioux Indian Reservation.

It is stated that surveys were commenced this week for a proposed extension from Chippewa Falls northeasterly to Ashland, Wis., on Lake Superior.

Chicago, St. Paul & Kansas.—President Stickney is reported in a Kansas City paper as denying that the extension from St. Joseph, Mo., to Kansas City would extend through Clay County and enter the latter city over the Winner bridge, now building. The extension, if built, will reach the city from the Kansas side, through Atchison or Leavenworth, Kan., or both cities. The company may, however, be able to make arrangements with the Missouri Pacific or the Kansas City, St. Joseph

& Council Bluffs, for running rights over the tracks of one of those roads between St. Joseph and Kansas City.

Chicago South Side Rapid Transit Co.—The company has executed a mortgage for $7,000,000 on its right of way and other property to secure an issue of bonds of the same amount. The mortgage is made in favor of the Northern Trust Company.

Colorado Midland.—A consolidated mortgage for $6,000,000 has been given to the Central Trust Co., of New York, and placed on record in the counties in Colorado through which the road runs. The mortgage is to take up outstanding debts and fund its securities at four per cent., and also provide funds for new equipment and construction work.

Columbus & Fulton.—A company of this name has been incorporated in Mississippi to build a road from a point on the Kansas City, Memphis & Birmingham near Aberdeen, Miss., north to Fulton. The survey for the line has already been made.

Columbus, Lima & Milwaukee.—President B. C. Faurot, of Columbus, O., states that the contract for grading part of the section between Columbus and Lima will be let next month. He claims that the road will be in operation between these points by Oct. 1. The section between Lima and Defiance, 43 miles, will shortly be opened. Most of the right of way between Lima and Columbus has been secured and work is now in progress on a heavy cut at Bellefontaine, which will not be finished before June 1. From Defiance the road will be built northwest to Bryan, where it will connect with the Cincinnati, Jackson & Mackinaw. The tracks of that road will be used to Saugatuck, from which point the line will be extended to Allegan, on Lake Michigan.

Danville.—This is the name of a road organized at Danville, Ky., to build a short line from that point south to a connection with the Louisville & Nashville. Boyle County has been asked to vote $40,000 to the company.

Delaware, Lackawanna & Western.—A survey was made last week for the proposed extension of the Passaic & Delaware division from its present terminus at Bernardsville, west about five miles to a connection at Peapack. N. J., with the Rockaway Valley road.

Denver. Texas & Ft. Worth.—Daniel Carey, of Ft. Worth, Tex., has the contract for the extension from Hodge to Ft. Worth City. It is reported that he has also been awarded the contract for grading the branch from Wichita Falls to Seymour, Tex. The locating survey for the latter line is now being made.

Duluth & Southwestern.—The Duluth, Huron & Denver has transferred to this company all its property and franchises, which consist of a partially completed roadbed, from Sauk Centre, Minn., southwesterly through Benson and Appleton to the western line of the state, on which there are many claims for unpaid debts.

Dunderberg Spiral.—A meeting of the stockholders will be held at 831 Broadway, New York City, on March 8, to vote on a proposed issue of $600,000 six per cent. 30 year bonds. James Morgan is President and David L. Proudfit is Secretary.

Ellensburg & Northeastern.—The work of erecting the bridges between Ellensburg, Wash., and the Columbia River will be commenced immediately. This part of the line has been graded. The survey has been made from Ellensburg southwest to the Columbia River at a point four miles below Port Eaton. The survey is to be continued from this point across the Columbia to Providence station on the Northern Pacific, and thence northeast to Davenport on the Central Washington branch of the Northern Pacific. The maximum grade on the section between Ellensburg and the Columbia River is 116 ft. per mile. Herbert C. Ward is Chief Engineer.

Etowah Iron Co.—The company will construct and equip a five mile narrow gauge road from its furnace at Cartersville, Ga., to the river.

Fairhaven & Southern.—Work is now in progress on this road at four different points. The line is in operation from Fairhaven east to Sedro, Wash., 26 miles, and work is in progress easterly from that point up the Skagit River, 20 miles. From New Westminster, B. C., south, 24 miles is completed, leaving four miles to reach the international boundary line. A force of men is working on the 25 miles south from the boundary line to Fairhaven. A section of 18 miles is being graded from Sedro, south toward Seattle.

Fort Madison & Northwestern.—The road was again sold in Fort Madison, Ia., Feb. 24, to Willard Block, of Des Moines, who is said to represent the Iowa & Nebraska, for $38,100, subject to tax and right of way liens amounting to $15,000, making the total price $53,100. If the sale is confirmed the road will be made standard gauge and extended to Ottumwa.

Fort Worth & Rio Grande.—This road was opened to a connection with the Houston & Texas Central, at Dublin, Erath County, Tex., Feb. 24.

The line for which contracts are to be let this month extends from Dublin southwest to Comanche, about 25 miles, and not to Granbury, as recently stated.

Franklin & Tilton.—The location of the line from a point on the Northern New Hampshire, about a mile south of Franklin, to Tilton, on the Concord & Montreal, a distance of about four miles, has been filed with the state officers at Concord, N. H. The road will be built jointly by the Concord & Montreal and the Boston & Maine.

Georgia, Carolina & Northern.—John Kelly, of Lynchburg, Va., has a contract for five miles in each direction from Elberton, Ga., and Wright Bros., of Birmingham, also have a 10-mile contract. The work to the Savannah River is practically completed, and a large force will soon be at work between that place and Athens, Ga. The line in Georgia, between the Savannah and Atlanta, will be about 110 miles long. The route is through Elbert, Madison, Oglethorpe, Clarke, a corner of Walton, Gwinnett and Fulton counties.

Gettysburg & Harrisburg.—A survey was completed last year for a proposed extension of the line from Gettysburg to Washington, D. C., a distance of about 75 miles. The survey crosses Carroll County, Md., for about 40 miles and through the town of Westminster, and the company has asked that county to vote $5,000 for each mile in the county, and grant free right of way.

International & Great Northern.—Judge Pardee, in the United States Circuit Court, at New Orleans, on Feb. 20, denied the motion of the Missouri, Kansas & Texas for an injunction to restrain the Farmers' Loan & Trust Co., of New York, from the further prosecution of its suit in the District Court of Smith County, Texas, and to foreclose the second mortgage upon the International & Great Northern road. The Missouri, Kansas & Texas owns the stock of the International & Great Northern, and has removed the foreclosure suit into the federal court. It will now attempt to prevent a decree in the state court in Texas, pending its appeal to the Supreme Court of the United States. The motion was denied upon the ground of want of power in the federal court, at this time, to enjoin the proceedings in the state court.

Kearney, Hutchinson & Gulf.—This company which was incorporated in Nebraska last December filed its charter in Kansas this week. The route is 900 miles long, from Kearney on the Union Pacific across Kansas to Galveston, Tex. The offices will be at Beloit, Kan., and Kearney, Neb.

Louisville, Hardinsburg & Western.—It is expected that the entire road will be completed and opened within 60 days. All of the material for completing the line has been delivered. The route is from Irvington on the Louisville, St. Louis & Texas, in Breckenridge County, Ky., to Fordsville, in Ohio County, with a branch of 4¼ miles from Rock Vale to Falls of Rough, in Grayson County. The entire length of the line, including the branch is 42½ miles. The grading and bridging on the main line is practically finished, and about 25 miles of track has been laid. The road is leased to the Louisville, St. Louis & Texas, which will furnish the equipment, and operate the line when finished. The line will develop a heavy traffic in oak and poplar lumber, and open up bituminous coalfields within 80 miles of the city of Louisville.

Louisville, New Orleans & Texas.—The tracklaying has been completed for the first 15 miles from Clarksdale, Miss., south toward Minter City. The grading will soon be completed to the latter city, and the branch will be opened to that point in May. The survey has been made south of Minter City to Yazoo, and the location is now in progress. Owing to difficulties in obtaining the right of way the grading has not been begun on this section.

Macon & Birmingham.—The grading on the first 67 miles from Macon west to Woodbury, Ga., has been completed and J. S. McTighe of Memphis, who built this section, have been awarded the contract for grading the next 37 miles west of Woodbury. The locating survey has been completed on the section in Georgia and reached Roanoke, Randolph County, Ala., this week. The line in Alabama will probably pass through Roanoke, Ashland, Talladega and Leeds to Birmingham, 220 west of Macon. The right of way has been secured as far as La Grange, Troup County, Ga., near the Alabama state line.

Manhattan (Elevated).—The stockholders held a special meeting in New York City, Feb. 26, to act upon the proposition to issue $40,000,000 in bonds, secured by a consolidated blanket mortgage on all the elevated railroad property in the city. Altogether 216,943 shares of stock out of a total of 250,000 were voted in favor of the proposition, there being no dissenting vote. The bonds will run 100 years at four per cent., and replace first and second mortgage bonds of the Metropolitan Elevated, and first mortgage and debenture bonds of the New York Elevated, to the amount of $26,000,000, leaving a surplus of $14,000,000 for investment by the company. By issuing the new bonds the company replaces the old issues at a lower rate of interest, consolidates its debt, and obtains a fund to pay for contemplated improvements and extensions.

The plans for these improvements have not been fully completed, but it has been decided to expend $60,000 in strengthening the Ninth avenue structure. Vice-President Galloway says that a third main track will not be built. Much of the new capital will go for damage awards to property owners, and some for improving the terminal facilities at the Battery and at Harlem.

Manitoba & Northwestern.—The company has secured trackage rights over the line of the Canadian Pacific from its present terminus at Portage la Prairie to Winnipeg, Man., a distance of 56 miles.

Memphis & Atlantic.—Ground was broken last week on the section between West Point and Abbott, Miss., at a point in Clay County about four miles from West Point.

Mexican Roads.—Dispatches from the City of Mexico state that Americans offer to furnish the funds for the construction of the Estevas concession road from Guadalajara west to Chancela, on the Pacific coast, and east from Guadalajara to Aguas Calientes, on the Mexican Central.

Middleburg, Highland & Lake Butler.—The tracklaying on this road from Middleburg, Fla., has been completed northwest for a distance of 10 miles, and is now in progress from Highland west to Lake Butler. The line connects with the Florida Central & Peninsula at Highland. It is being built by the Jacksonville, Middleburg & Lake Butler Transportation Co. J. A. Bryan, of Jacksonville, is General Manager.

Middle Georgia & Atlantic.—About 10 miles of track has been laid from Machen, Ga., east toward Eatonton. Most of the grading has been completed between these points. The maximum grade is 52.8 ft. per mile, and the maximum curves are five degrees. There is one combination iron and wood bridge 200 ft. long. It is expected to have the road in operation by April 1 next. The Georgia Improvement & Mfg. Co., which has a paid in capital stock of $50,000, has the contract to build and equip the line. It receives the stock and first mortgage bonds of the road for its work. The road was chartered Oct. 16 last, and succeeds the Eatonton & Machen, which was organized Sept. 9, 1889. The company is capitalized at $12,000 per mile of first mortgage, six per cent. 30-year bonds, and $12,000 of common stock. The Mercantile Trust Co., of New York, is trustee for the bondholders.

Mississippi & Little Rock —R. W. Worthen, of Little Rock, Ark., who has the contract for building this road from Duncan, on the Arkansas Midland, six miles east of the White River, to Little Rock, 61 miles west, has asked the Little Rock Board of Trade to subscribe $400,000 to the capital stock of the company. About $150,000 has been subscribed by private parties. About 20 miles of the road is now graded, and 100 men are at work on the line. Most of the ties have been cut and delivered. There will be two iron bridges over the White and Arkansas rivers. The route is through a generally level country, part of it being heavily timbered, and the rest mostly cotton-growing land. P. C. Dooley is President and James A. Martin is Chief Engineer, both of Little Rock.

Monterey & Mexican Gulf.—Tracklaying on the extension from Monterey northwest to Venadito, Mex., on the Mexican International has been completed to Garcia, a distance of 20 miles. The work is being completed at the rate of about one and a half miles a day. The extension is about 100 miles long. As soon as the line is completed to Venadito work will be resumed on the main line from Linares, the present terminus, to Tampico, 380 miles southeast of Monterey. It is expected that the entire road will be completed by Jan. 1, 1891.

Moosilauke.—Surveys are to be made for a cog wheel road to the top of Mt. Moosilauke, N. H., as soon as the weather will permit. It is believed that such a road up the mountain will be feasible. Preliminary surveys have been made from Warren on the Concord & Montreal to the base of the mountain, and this line is to be supplemented by the cog-wheel road to the summit. The distance will be 20 miles. The grades will be four per cent. (compensated) and probably some 15 degree curves. An approximate estimate of the cost of the road places it at $20,000 per mile, ready for equipment. The mountain has an elevation of 4,815 ft. The top is a level plain with sufficient space for a number of hotels, and the view is said to be as fine as that from Mt. Washington. F. W. Conn, Concord, N. H., is Chief Engineer.

New Roads.—A road about 18 miles long is to be built by the East Tennessee & North Alabama Coal & Iron Co.

Articles of incorporation have been filed by the La Plata Coal & Iron Co., of Durango, Col., to build a branch from the Denver & Rio Grande to the La Plata coal mines, a distance of about 10 miles. The capital stock is $100,000 and the principal office will be in Durango.

A road is projected to extend from Media, Delaware County, Pa., south to Chester, on the Delaware River.

New York, Danbury & Boston.—A stockholders' meeting will be held at No. 96 Broadway, New York City, to authorize an increase of the capital stock to $4,000,000. C. W. Smith is President and C. H. Roosevelt is Secretary.

Norfolk & Western.—Ties have been distributed on the Clinch Valley branch as far as Burding's Fork, in Russell County, Va.

Northern Central.—The annual report for the year to Dec. 31 shows gross earnings $6,089,956, a decrease of $133,437; operating expenses, $4,125,600, an increase of $32,026; net earnings, $1,944,356, a decrease of $165,464. The revenue from other sources was $503,371, making the total income $2,447,728. The balance applicable to the payment of dividends, after deducting rentals, interest, etc., is $757,548, or a little over 10 per cent. upon the capital stock. After paying an eight per cent. dividend a balance of $185,573 was left to be placed to the credit of the profit and loss account. The amount received from the transportation of passengers was $1,101,722, an increase of $36,860. The coal tonnage of the main line was 3,026,431 tons, a decrease of 86,502 tons. The charges to capital account were $176,425 for equipment, $31,688 for real estate, and $51,730 for construction, a total of $359,843. The portion of the amount due on account of the Allegheny Valley guarantee, $66,666, was charged to income accounts.

Ohio, Indiana & Western.—The road was sold Feb. 20 at Indianapolis by the Master in Chancery, under a recent order of Judge Gresham. The sale was merely a matter of form. The stockholders purchased the road through Samuel Spencer, representing the Reorganization Committee. His bid was at the lowest figure provided in the order, $3,000,000. This sale, it is said, is the last step necessary to place the property entirely in the hands of the Cleveland, Cincinnati, Chicago & St. Louis.

Olympia & Chehalis Valley.—A survey is reported in progress preliminary to changing this road from 3 ft. to standard gauge between Olympia and Tenino, Wash., a distance of 15½ miles.

Omaha, Garden City & Southwestern.—The company has been incorporated in Kansas City to build a road from a point on the north line of Kansas in Smith or Jewell County, southwest through the counties of Osborn, Rooks, Graham, Trego, Gore, Lane, Scott, Garfield, Finney, Grant, Stanton, Stevens, and Morton, terminating at a point on the west or south line of the state. The distance is about 260 miles. The capital stock is $7,200,000. The company will have offices in Garden City, Kan., and New York City.

Pacific Short Line.—It is reported that E. P. Reynolds & Co. will commence the track-laying on the division between South Sioux City and Plainview, Neb., 82 miles, this week. Grading is in progress from Plainview, Neb., west to O'Neil, 45 miles. It is claimed that 200 miles of the division east from Ogden City, Utah, will be placed under contract shortly.

Pennsylvania.—The statement of the operations of all lines east of Pittsburgh and Erie for January, 1890, as compared with the same month in 1889, shows an increase in gross earnings of $613,555, an increase in expenses of $388,315, an increase in net earnings of $225,250. All lines west of Pittsburgh and Erie for January, 1890, show a surplus over all liabilities of $173,908, being a gain as compared with the same period of 1889 of $119,667.

Philadelphia & Seashore.—Tracklaying is reported in progress south from the connection with the Atlantic City road at Winslow Junction, N. J. The right of way has been cleared on the section between Sea Isle and Cape May Court House, on the southern division, and most of the grading has also been completed. The tracklaying will probably soon commence from Cape May City north.

Piedmont Southern.—Articles of incorporation have been filed in the office of the Secretary of State, at Montgomery, Ala., to build a road between Gadsden and Roanoke. The capital stock is $1,000,000.

Pittsburgh, Cincinnati, Chicago & St. Louis.—The stockholders of the Pittsburgh, Cincinnati & St. Louis Railroad and of the Chicago, St. Louis & Pittsburgh roads will vote upon a proposition to merge the two lines at the annual meetings in April under the above name. The new company will have $75,600,000 of bonded debt, $30,000,000 of preferred stock and $45,000,000 of common stock. The new securities will be issued to take up the stocks and bonds of the present companies. The terms are not yet made public, but the deal will be carried through in April. The roads to be merged are the Pittsburgh, Cincinnati & St. Louis, the Chicago, St. Louis & Pittsburgh, the Jefferson, Madison & Indianapolis, the Cincinnati, Richmond & Chicago, and the Cincinnati & Richmond, comprising about 1,051 miles.

Richmond, Nicholasville, Irvine & Beattyville.—About 1,600 men are engaged in the construction of this

line. As stated last week, the entire road is under contract. The road is being built by the Ohio Valley Improvement & Contract Co., which has a paid up capital stock of $500,000. D. Shanahan & Co., of Richmond, Ky., are the contractors, and are also stockholders in the construction company. It is practically an extension of the Louisville Southern, leaving the Lexington extension of that road at Versailles, and extending thence through Nicholasville, 16 miles to Richmond, 23 miles, from Richmond to Irvine, 23 miles, and from Irvine to Beattyville, 34 miles, a total distance of 96 miles. From Beattyville surveys are being made to points in southwest Virginia, and to the border lines of Kentucky and Tennessee. Tracklaying is now in progress from Nicholasville toward Richmond, the heaviest division of the work. There are two large viaducts between Nicholasville and Richmond, and between these two points the road also crosses the Kentucky River with a large bridge, having a centre span 300 ft. long. The bridge is 100 ft. high. At Irvine, Ky., the road again crosses the Kentucky River and follows it nearly to Beattyville. The work, as a rule, is light. There are four tunnels on the line, and three of these are already completed. The fourth and longest, which is 650 ft. in length, will be completed in 60 days. It is thought that the entire road will be open for traffic by Aug. 1 next. Judge A. E. Richards, of Louisville, is President of the Construction Company.

Roanoke & Southern.—The proposition to vote this company an additional $100,000 was approved by the voters of Roanoke, Va., at the election held Feb. 18.

Rockaway Valley.—The road was opened to freight and passenger traffic to Peapack, N. J., last week. The line is 12 miles long, from White House, on the Central of New Jersey, to Peapack, of which 7½ miles were completed last year.

Rutledge & St. Julian.—The Alabama Midland has agreed to complete the tracklaying and operate the road between Julian, on the Northwest & Florida division, to Rutledge, Ala., a distance of three miles, when the line has been graded and terminal facilities at Rutledge secured.

San Antonio & Aransas Pass.—The north end of the Waco branch of this line has been completed from Waco to Lott, Tex., and was opened for business to that point Feb. 18. The stations and distances from Waco are as follows: Downs, 8.2; Gurley, 14.2; Chilton, 22.1, apd Lott, 28. Waco and Lott alone have agents.

Saratoga, Johnstown & Western.—This is the new name for the proposed road from Utica through Gloversville and Johnstown to Saratoga Springs. The Fitchburg and the Rome, Watertown & Ogdensburg have been asked to aid in the construction of the line, the company claiming that its construction would be of benefit to those roads, as it would be a connecting link between them.

Sault Ste. Marie & Hudson's Bay.—A bill has been introduced into the Ontario Legislature to incorporate the company to construct a road from Sault Ste. Marie to Moose Factory, on James' Bay, in Ontario, with power to work coal, iron or other mines along the line.

Savannah & Tybee.—The name of this road has been changed to the Savannah & Atlantic and a new charter has been applied for under that name. The road has been in the hands of a receiver for some time and was sold at foreclosure sale at Savannah, Ga., last December.

Seattle & Northern.—It is stated that the rails to finish the section of the road between Anacortes and Sterling, Wash., 30 miles, have arrived on the Pacific Coast, and will be put down in a short time.

Tobique Valley.—The rails have been distributed along the 14 miles between Perth Center and Plaster Rock, N. B., and the tracklaying will begin as soon as the weather will permit. The road is completed for the first four miles, and trains will probably be running to Plaster Rock early in the summer.

Toledo & Chicago Air Line.—A two per cent. tax was voted in Lagrange County, Ind., Feb. 18, to aid this road. Milton Mercer, of Goshen, is President.

Union Pacific, Denver & Gulf.—At a meeting of the stockholders of the Denver, Texas & Ft. Worth, Denver, Texas & Gulf and Ft. Worth & Denver City at Denver Feb. 20, the consolidation of those lines with the Colorado divisions of the Union Pacific was formally ratified. The controlled lines of the Union Pacific will hold a meeting March 4 to vote on the consolidation, and this action will be the last of the necessary legal formalities.

Union Point & White Plains.—The survey will soon begin for the proposed extension of this road (which is now operated by the Georgia road), from White Plains south through Sparta to Tennille, 31 miles. Another extension is proposed from Union Point north a distance of 38 miles, to Elberton, Ga., to connect at that point with the Georgia, Carolina & Northern, now under construction.

Virginia Roads.—The Virginia Legislature has been asked to incorporate the following roads: Bucksburg; Norfolk Belt; Roslyn, Arlington, Alexandria & Mt. Vernon; Tye River & Rockfish Valley, and the Harrisonburg & Elkton, and also the Richmond & Manchester Bridge Co. Bills have also been introduced to amend the acts incorporating the Fannville & Powhatan and the Richmond, Fredericksburg & Potomac.

Watauga Valley.—The survey is being made from the connection with the Charleston, Cincinnati & Chicago at Johnson City, Tenn., to the North Carolina state line.

Wellsville, Coudersport & Pine Creek.—The project of building a road from Coudersport, Pa., north to Wellsville, N. Y., has been revived and it is stated that a contract for regrading the road has been let.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Feb. 25, 1890.

The traffic situation here is practically unchanged from last week. The various committees have adjusted westbound rates on the basis of the new St. Paul and Missouri River rates and have adjourned, but there is a general uneasiness in all quarters, and a feeling that the present rates are likely to remain in effect only temporarily.

The Western Freight Association completed its work of readjusting rates in its territory—made necessary by the recent reductions to St. Paul—on Saturday, and adjourned, after a continuous session since Feb. 11. The St. Paul basis has been established to nearly all Iowa points east of and including Des Moines. The new rates apply only on westbound business. The 60-cent scale of rates from Chicago to all Missouri River points from Sioux City to Kansas City went into effect Feb. 22. Commodity rates remain in effect unless the new basis makes a lower rate based on the classification.

The Trans-Missouri Freight Association has also been in session here all the week readjusting rates to its territory, made necessary by the reduction in the Missouri River rate. The rates established are generally the sum of the locals to and from the Missouri River, except to some interior points which, by reason of geographical situation, claim lower rates. This association had been at work for several months on a new schedule of rates, and the recent reductions make useless a great amount of labor.

The net result of the recent reductions in westbound freight rates may be summarized as follows:

Chicago to St. Paul	1	2	3	4	5
Former rate	60	50	40	25	20
New rate	40	30	22	17	12½
Proportion west of Chicago on through west-bound business.					
Old proportion	45	39	33	23	19
New proportion	30	22	17	15	12
Chicago to Omaha and Kansas City.					
Former rate	75	60	40	30	25
New rate	60	50	35	25	18
St. Louis and other Mississippi River points to Omaha and Kansas City.					
Former rate	55	40	30	25	20
New rate	40	30	25	20	13

From Chicago and St. Louis to points in Iowa, Minnesota, Wisconsin and Missouri rates have been modified under the short haul clause and brought within the new St. Paul and Omaha rates as maximums. Eastbound rates remain unchanged, except on the leading articles of live stock and grain. Cattle rates were recently reduced from 25 cents to 12½ cents from Kansas City to Chicago, and the through rates from points of origin to Chicago were scaled down accordingly. The rates on corn from points in Kansas and Nebraska to Chicago were reduced 10 per cent, with a minimum of 20 cents and a maximum of 25 cents. The rates previously in effect varied from 21 to 32 cents, and the average reduction is somewhat over 10 per cent. by reason of the new 25 cent maximum.

The Chicago & Alton has given notice that is not a party to the recent reductions in the rates on corn from Nebraska and Kansas points, and it reserves the right to make such adjustment of the rates east of the Missouri River as it may find necessary to preserve the relations between the sum of the locals and the through rates.

The Chicago, Burlington & Northern has again reduced the passenger rates between Chicago and St. Paul to $7 first-class, a cut of $2 from the last cut. This action has increased the feeling of hostility on the part of the other St. Paul lines, but just what shape their retaliation may take is not yet apparent.

Messrs. J. W. Midgley, of the Western Freight Association, A. C. Bird, of the Chicago, Milwaukee & St. Paul, and J. M. Johnson, of the Chicago, Rock Island & Pacific, represent the Western lines at the meeting of the Uniform Classification Committee, at Old Point Comfort.

Chairman Walker, of the Interstate Commerce Railway Association, in a decision on an application for a rate of 60 cents on common soap in carloads from Missouri River points to Colorado points, says:

"I cannot admit the propriety, except in cases of very special urgency, of taking a single article from its standard position under the classification, and assigning it a special or commodity rate. It is alleged that a reduced rate will increase the transportation of soap from eastern points, as against the product of manufacturing establishments in Colorado; but a very slight reduction in the selling price of the latter would restore the present conditions, and no increased shipment would seem likely to follow the change, except perhaps for a very brief period. The granting of the rate would establish an unfortunate precedent, and the application is disapproved."

A request of the Chicago, St. Paul, Minneapolis & Omaha to be allowed to put in effect the same rates on coarse grain from Omaha to St. Paul and Minneapolis as is made from Omaha to St. Louis, is also refused. This is not a parallel case with the west bound rate matter recently decided. That concerned proportions of through rates strictly. This would involve a question of Chicago differentials. The present rates from Nebraska to St. Paul were established without the permission of any association. Omaha is not necessarily to be treated as on an equality with Sioux City. The rate per mile Omaha to St. Louis is very low, and comparative distance is not a controlling factor in this case.

A dispatch from St. Louis says the St. Louis & San Francisco has withdrawn its passenger business from the control of the Southern Interstate Association. This is done for the same reason which led that road to take similar action in regard to the Trans-Missouri Association a short time since.

Traffic Notes.

Owing to the great scarcity of seed grain throughout Minnesota and Dakota, the Great Northern announces a reduction of 50 per cent. in rates on seed grain during the month of April.

The Weighing and Inspection Bureau at Cleveland handled 13,000 tons of freight in January. The excess over shippers' weights was 16 per cent., and the estimated saving is $1,969.

On March 1, the Indianapolis Car-Service Association will take in the following additional junction points: Fort Wayne, Goshen, Elkhart, Columbia City, Plymouth, Warsaw, Huntington, Rochester, Decatur and Bluffton.

The Wabash Railroad announces a second class sleeping car to run fortnightly between Boston and Kansas City. It will go over the Fitchburg and West Shore, and we are informed that the train "pierces the heart of New York State at a convenient hour."

A train of Eastman heater cars from Minneapolis via the Canadian Pacific Dispatch line, arrived in Boston Feb. 20. The cars were loaded with potatoes, and were on the road eight days, coming through some pretty severe weather, the thermometer registering as low as 20 degrees below zero. The potatoes were in perfect condition.

It appears by an announcement from the Chicago, Milwaukee & St. Paul that the time of the through trains to California is again to be shortened. The St. Paul announces that its train leaving Chicago at 11:10 p. m. will hereafter arrive at Council Bluffs at 2 P. M., and that the Union Pacific train will leave there at 2:30, which is nearly four hours earlier than the present schedule. The through train between Chicago and Denver over the Chicago & Alton and the Union Pacific, goes on March 2.

The Travelers' Exchange in Union Square, New York City, is about to wind up its business. It was organized a year ago with a capital of $100,000, most of the hotel proprietors of New York becoming shareholders. Its object was the establishing of a bureau of information for the convenience of hotel guests and the traveling public at large. A handsome and expensively furnished suite of rooms was fitted up, and preparations were made for doing business on a large scale, but when the trunk lines voted not to establish a joint ticket agency in the exchange the board of directors decided to close up the affairs of the concern.

Party Rates Illegal.

A decision by the Interstate Commerce Commission in the case of the Pittsburgh, Cincinnati, & St. Louis against the Baltimore & Ohio was announced last week. The opinion was written by Commissioner Veazey. The complaint, it will be remembered, was against "party rates," so-called, whereby parties of 10 or more persons traveling together on one ticket are transported at two cents a mile, the regular rate for a single person being about three cents per mile; and that the Baltimore & Ohio also sold round-trip excursion tickets without publicly posting the rates. The Commission, in its decision, holds that passenger excursion rates are required to be published; that party-rate tickets are not commutation tickets, and, when party rates are lower than contemporaneous rates for single passengers, they constitute discrimination and are illegal.

Suspension of the Corn-rate Order.

Upon the application of the defendants and the Baltimore & Ohio, in the case of Hervey Bates and H. Bates, Jr., against the Pennsylvania, the order of the Interstate Commerce Commission, made Feb. 7, 1890, directing that the roads cease discriminating in rates between corn and corn products from Indianapolis to Eastern seaboard points, has been suspended, and a hearing ordered for March 6, 1890. It has also been ordered that the following roads appear on the day named and show cause why the order of Feb. 7, or such other order as may be made in the case, should not be made to apply to them: The Lake Erie & Western; the Ohio, Indiana & Western; the Cincinnati, Hamilton & Indianapolis; the Cleveland, Cincinnati, Chicago & St. Louis, and the Louisville, New Albany & Chicago.

Sunday Freight Trains.

The Pennsylvania Company has put on two Sunday trains, one each way, for freight, on the Cleveland & Pittsburgh in order to accommodate the traffic. The reason given is that some of the principal roads have not co operated in the movement to abolish Sunday trains.

Dressed Beef Traffic.

The Trunk Line Association has just issued the following statement showing the movement of cattle and dressed beef from the West for the last eight years:

RECEIPTS AT BOSTON AND INTERIOR NEW ENGLAND POINTS.

	Cattle. Tons.	Dressed Beef. Tons.
1882	76,410	89,150
1883	100,901	116,746
1884	74,505	121,017
1885	54,192	138,876
1886	52,431	153,544
1887	57,325	179,733
1888	70,186	187,732
1889	97,189	225,167
Total	583,139	1,211,965

RECEIPTS AT NEW YORK.

	Cattle, tons.	Dressed beef, tons.
1882	366,487	2,633
1883	392,095	16,365
1884	328,220	34,956
1885	337,802	53,344
1886	280,184	59 769
1887	288,662	70,734
1888	327,406	96,224
1889	412,962	106,235
Total	2,738,818	450,260

Percentages of Westbound Shipments.

Some officer of the New York, Lake Erie & Western has given a reporter the following: The Erie's percentage of all last year's freight out of New York to competitive points was 20.9 per cent., against 22.1 by the New York Central and 22.5 by the Pennsylvania. The Erie's average from Jan. 1, 1890, to Feb. 15 was 22.2 per cent. of all the tonnage, which is better than that of the two stronger lines. The West Shore had 6.4 per cent. of the business last year. During January and February this year it made a sudden leap, and the average up to the middle of this month was 10.1 per cent. Its average for January was 9.4 per cent.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Feb. 22, amounted to 72,933 tons, against 100,775 tons during the preceding week, a decrease of 27,842 tons, and against 68,651 tons during the corresponding week of 1889, an increase of 4,282 tons. The proportions carried by each road were:

	W'k to Feb. 22.		W'k to Feb. 15.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	7,614	10.4	11,468	11.4
Wabash	5,630	7.7	6,028	6.0
Lake Shore & Michigan South.	16,264	22.3	18,358	18.2
Pitts., Ft. Wayne & Chicago	10,042	13 8	14,195	14.1
Chicago, St. Louis & Pitts.	8,150	11.2	10,684	10.6
Baltimore & Ohio	4,790	6.5	8,622	8.5
Chicago & Grand Trunk	8,655	11.9	10,052	10.0
New York, Chic. & St. Louis	4,751	6 6	8,330	8.3
Chicago & Atlantic	7,037	9.6	13,038	12.9
Total	72,933	100.0	100,775	100.0

Of the above shipments 3,256 tons were flour, 42,172 tons grain, 1,536 tons millstuffs, 4,628 tons cured meats, 2,604 tons lard, 7,358 tons dressed beef, 1,058 tons butter, 1,494 tons hides, 168 tons wool and 4,668 tons lumber. The three Vanderbilt lines together carried 39.3 per cent. of all the shipments, while the Pennsylvania lines carried 25.0 per cent.